

U.S. DEPARTMENT OF THE INTERIOR  
NATIONAL BIOLOGICAL SERVICE

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*BIOLOGICAL SCIENCE REPORT 6*

BOTANICAL  
RECONNAISSANCE  
OF THE TUXEDNI  
WILDERNESS AREA,  
ALASKA

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Cover plate: *Alpine Heuchera* (*Heuchera glabra*), a common perennial herb that occurs on moist cliffs in Tuxedni Wilderness Area, Alaska.



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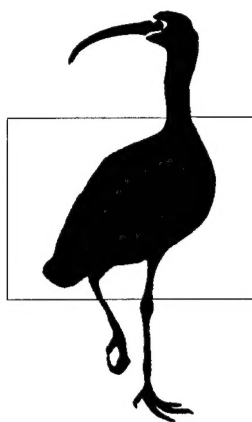
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*BIOLOGICAL SCIENCE REPORT 6*  
JUNE 1995

BOTANICAL  
RECONNAISSANCE  
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By

Stephen S. Talbot, Sandra Looman Talbot,

and

Stanley L. Welsh

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*Frontispiece: Green alder (Alnus crispa), the most abundant plant in Tuxedni Wilderness Area, Alaska in spring; the leaves are partially unfolded; staminate and pistillate catkins are visible.*

# Botanical Reconnaissance of the Tuxedni Wilderness Area, Alaska

by

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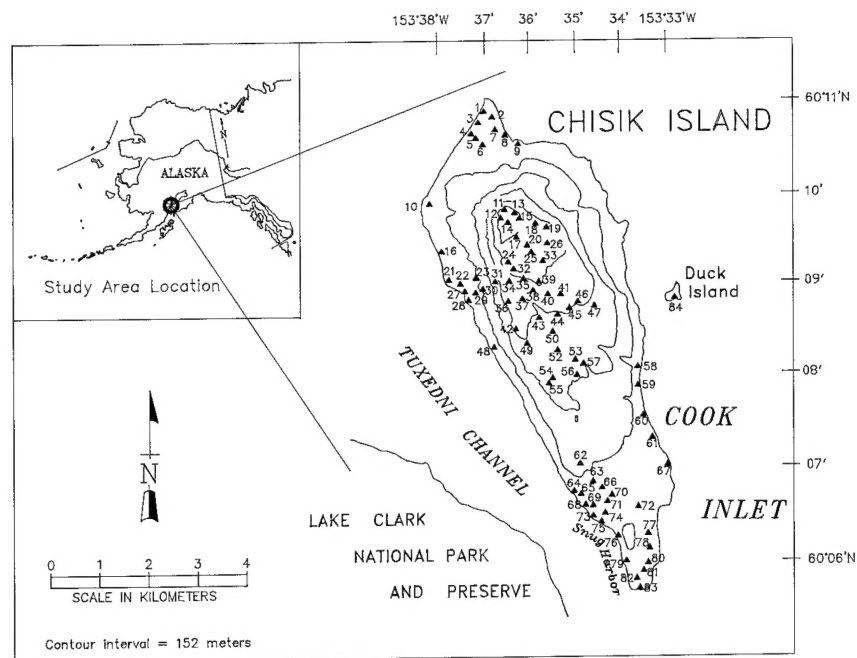
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**Abstract.** The vascular flora of two small maritime islands, Chisik Island and Duck Island (2,302 ha) that comprise the Tuxedni Wilderness Area in the western lower Cook Inlet, Alaska, was recorded to determine species composition where few previous collections had been reported. The field study was conducted in sites selected to represent the totality of the environmental variation in the Tuxedni Wilderness Area. A total of 290 species—279 native and 11 introduced—was identified. To provide a comparative phytogeographic framework, we analyzed data from published reports that categorized vascular plant distribution patterns from circumpolar, North American, and Alaskan perspectives. The flora of the Tuxedni Wilderness Area primarily includes species of circumpolar (36.6%), eastern Asian (22.9%), and North American (20.4%) distributions. The most important longitudinal distributional classes in North America consist of transcontinental (59.9%) and extreme western species (32.2%). The distribution of species in the Tuxedni Wilderness Area in latitudinal zones peaks in the high subarctic and low subarctic and gradually decreases from the low to the high arctic. The annotated list of species in the Tuxedni Wilderness Area expands the known range of many species, filling a distributional gap in the Hultén's Central Pacific Coast district. Forty-four range extensions are reported. Latitudinal zone comparison based on the Raunkiaer life-form spectrum suggests the flora of the Tuxedni Wilderness Area is closest to the high subarctic zone.

**Key words:** Coastal, life form, middle boreal zone, phytogeographic, upper oroboreal zone, vascular flora.



**Fig. 1.** The Tuxedni Wilderness study area, Alaska, and collection sites.

The Tuxedni Wilderness Area on the western shore of the lower Cook Inlet, Alaska, consists of Chisik Island and Duck Island (Fig. 1). The area is a remote, picturesque, and relatively undisturbed sea bird sanctuary that is part of the Alaska Maritime National Wildlife Refuge of the U.S. Fish and Wildlife Service. Our list of the flora, descriptions of habitat and floristic distribution, and commonness rating of each species are basic information for an assessment (Fox et al. 1987) by the U.S. Fish and Wildlife Service of air quality and its effect on natural resources in the Tuxedni Wilderness Area. The development of a list of plants in the Tuxedni Wilderness Area is particularly important because the flora was not known. From a more inclusive and wider geographic perspective of the western Central Pacific Coast district of Hultén (1941), plant collections are documented by Hultén (1941, 1968), Osgood (1901, 1904), Racine and Young (1978), and Westerman (1982). The nearest known regional collections are recorded in Hultén (1940) from Tyonek (W. H. Evans in 1897; A. H. Brooks and L. M. Prindle in 1902) and from Lake Iliamna, Iliamna Bay, the head of Lake Clark (M. W. Gorman in 1902), and Lake Clark National Park (Racine and Young 1978).

We made a checklist of the vascular plant flora; assigned a commonness rating—abundant, common, uncommon, and rare—to each species; recorded information about the habitat of each species; collected voucher specimens of all vascular plant species; made preliminary descriptions of the major plant communities to

facilitate a better understanding of the habitat notes in the vascular plant checklist; and described the phyto-geographic pattern of the Tuxedni Wilderness Area to provide a comparative context with vascular plant distribution in circumpolar regions, North America, and Alaska.

## Geographical Setting

### *Location*

The Tuxedni Wilderness Area is located at 60° 08' N, 152° 35' W at the head of the Tuxedni Bay on the western side of the lower Cook Inlet. Chisik Island, the larger of the two islands, is 10.5 km long and encompasses about 2,297 ha. Duck Island, which is adjacent and east of Chisik Island, is only 0.3 km long and encompasses only 6 ha. Chisik Island is separated from the mainland by the Tuxedni Channel, which ranges in width from 1.1 to 3.2 km.

The topography of Chisik Island is rugged (Wanek 1968). From the southern end of the island, the land rises gradually along a ridge to the highest point at 815 m in the northern portion where it drops precipitously to the sea along rock cliffs (Fig. 2). The eastern and western slopes rise steeply from tidal flats to the ridge crest.

Physiographically, the study area is in the Alaska-Aleutian Province of the Alaska Range (Southern Part)

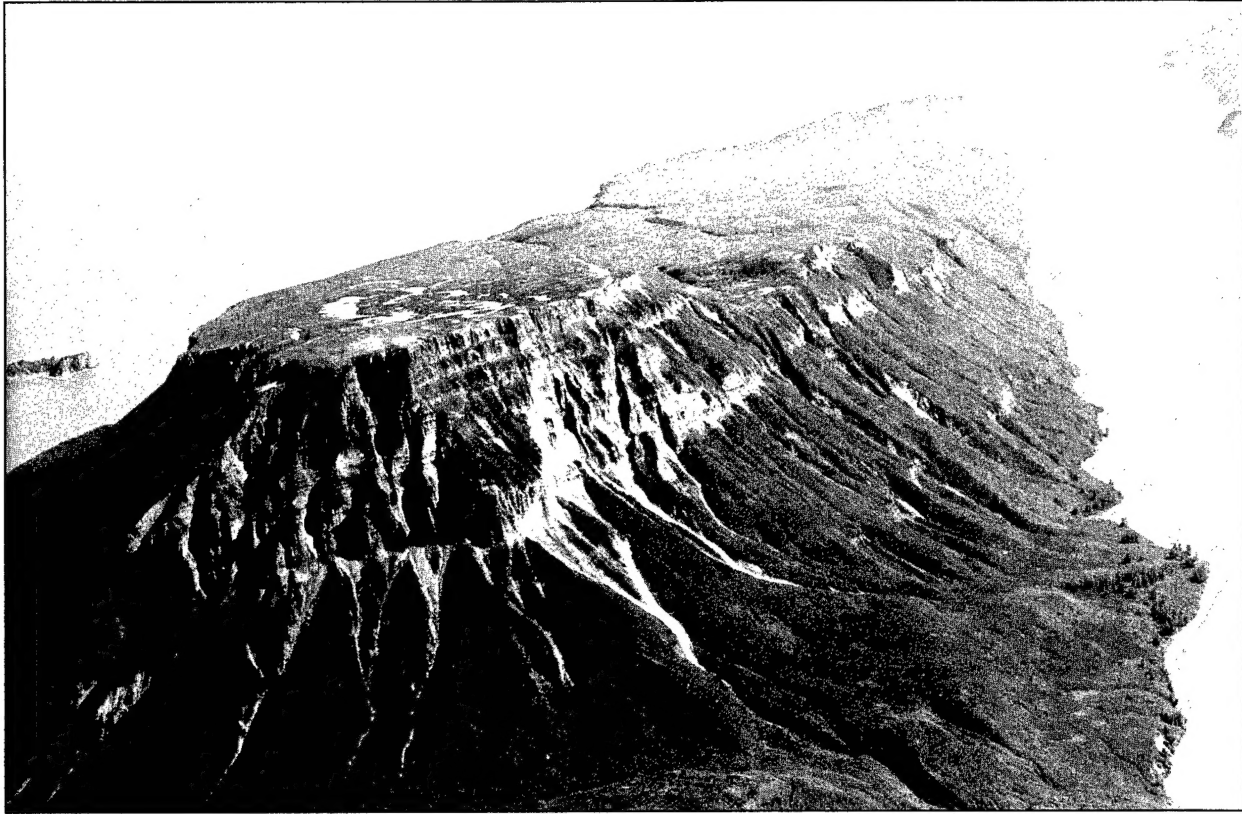


Fig. 2. Chisik Island, Alaska, from the northwest; Duck Island and Cook Inlet are to the left and center and the Tuxedni Channel and the Lake Clark National Park and Preserve are to the right.

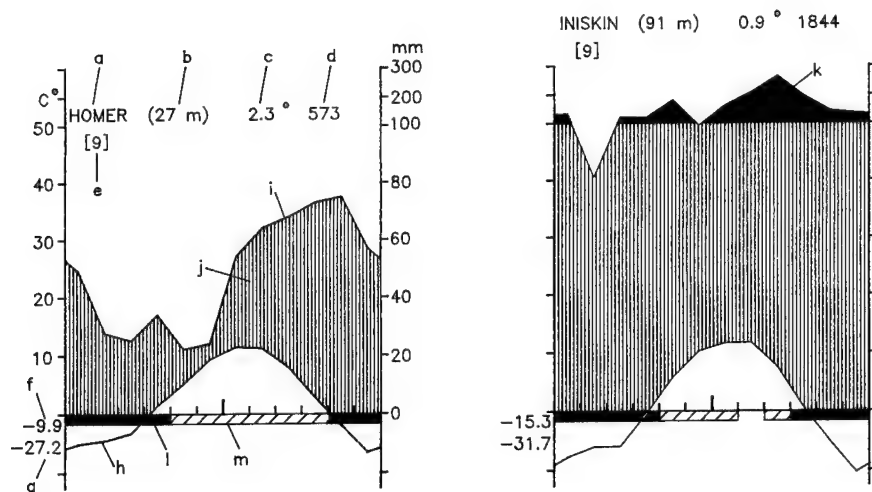
Section of Wahrhaftig (1965) and in the Coastal Zone of Racine and Young (1978).

### *Climate*

The Tuxedni Wilderness Area is at the northern latitudinal limit of the maritime zone (Selkregg 1974), which is distinguished by heavy precipitation, cool summers, and warm winters. Based on available records (1954–62) from the Iniskin climatic station ( $59^{\circ} 45' \text{ N}$ ,  $153^{\circ} 14' \text{ W}$ ), 55 km southwest of Chisik Island on the western side of Cook Inlet, the mean annual temperature is  $0.9^{\circ} \text{ C}$  and the mean annual precipitation is 1,844 mm (Arctic Environmental Information and Data Center 1989). In contrast, Homer ( $59^{\circ} 38' \text{ N}$ ,  $151^{\circ} 33' \text{ W}$ ) on the eastern side of Cook Inlet, located 80 km southeast of Chisik Island, is classified in the transition zone (Selkregg 1974). Homer has a slightly milder mean annual temperature,  $2.9^{\circ} \text{ C}$ , and substantially less precipitation, 632 mm, in the same reporting period. Annual and monthly differences are depicted in a climatic diagram (Fig. 3; Walter et al. 1975). The total annual snowfall at Homer, 1,400 mm, is approximately one third that of

Iniskin, 5,103 mm (Arctic Environmental Information and Data Center 1989). The drier climate of Homer is due to the influence of the Kenai Mountains with elevations of 1,220 to 1,830 m. As air is lifted over the mountains, most of its moisture is deposited on the windward side (National Climatic Data Center 1987). Chisik Island, as represented by the data from Iniskin, receives more precipitation because weather patterns driven by southeasterly winds can penetrate into portions of Cook Inlet through a gap between the tip of the Kenai Peninsula and the Alaska Peninsula.

Bioclimatic vegetation zonation facilitates comparison of floras from ecologically homologous regions (Hämet-Ahti et al. 1974). Thus, based on the ecoclimatic-phytogeographical system of Tuhkanen (1987: Fig. 18), the study area is in the middle boreal zone, hyperoceanic ( $\text{O}_2$ ) sector, and humid (h) province. With a formula to determine climatic zone (Hämet-Ahti et al. 1974), we calculated a mean annual biotemperature of  $3.9^{\circ} \text{ C}$  in Iniskin, which places it in the upper oroboreal zone, the vertical equivalent of the northern boreal zone. In contrast to the basal, middle (oro-) boreal zone described by Tuhkanen of the area at sea level, the Iniskin



**Fig. 3.** Key to climatic diagrams (after Walter et al. 1975). Abscissa: Months (January to December); Ordinate: one division =  $10^{\circ}\text{C}$  or 20 mm precipitation. a = station, b = height above sea level (m), c = duration of observations in years, d = mean annual temperature in  $^{\circ}\text{C}$ , e = mean annual precipitation in mm, f = mean daily minimum of the coldest month, g = lowest temperature recorded, h = curve of mean monthly temperature, i = curve of mean monthly precipitation, j = relative humid period (vertical shading), k = mean monthly precipitation >100 mm (black scale reduced to 1/10, l = months with mean daily minimum below  $0^{\circ}\text{C}$  (black) = cold season, m = months with absolute minimum below  $0^{\circ}\text{C}$  (diagonal shading) = late or early frosts occur.

weather station at 91 m probably recorded colder conditions.

By the alternative classification system of Thornthwaite (1948), Iniskin is classed as  $\text{AC}'^2\text{rc}'^2$ , which means that the climate is perhumid (moisture index = +351), second-order microthermal (annual potential evapo-transpiration = 44.1 cm) without water deficit (index of aridity = 0) and with a relatively high summer concentration of thermal efficiency (summer concentration = 75%; Patric and Black 1968).

### Geology and Soils

The Tuxedni Wilderness Area is underlain by sedimentary bedrock of highly fossiliferous Middle-to-Upper Jurassic age (Detterman and Hartsock 1966). The major constituents of the rock are siltstone, sandstone, and conglomerate. Surficial deposits occur on Chisik Island along the west-central and northern portions as alluvial fans and on the northern end as beach terraces.

Soil development occurs on undifferentiated alluvium and coarse rubbly deposits on steep mountains and hills (Karlstrom et al. 1964). In a reconnaissance survey of the soils of Alaska, Rieger et al. (1979) mapped the Tuxedni Wilderness Area in the Typic Cryandepts as very gravelly, hilly to steep Rough Mountainous Land Association of the Alaska Peninsula and Southwestern Islands Land Resource Area. According to Rieger et al. (1979), the dominant soils under 600 m elevation are Typic Cryandepts. These soils are covered with a mat of

litter and consist of strongly acid, dark reddish brown volcanic ash (25–50 cm) over dark brown gravelly loam.

### Vegetation

The small-scale vegetation map of Alaska (Joint Federal-State Land Use Planning Commission for Alaska 1973) classifies the vegetation of the Tuxedni Wilderness Area as dominated by *Alnus crispa* thickets with an understory of grasses and ferns. In a 1:63,360-scale vegetation map of the Tuxedni Wilderness Area, Racine and Young (1978) mapped six types: (1) coastal Sitka spruce forest, (2) alder shrub thicket, (3) dry alpine tundra, (4) alpine barrens, (5) *Calamagrostis* grassland, and (6) *Elymus* shoreline.

Additional insight into the nature of the regional vegetation is described by Detterman and Hartsock (1966:5):

If any single factor were to be considered the greatest deterrent to field investigation in the Iniskin-Tuxedni region, the unanimous choice would be the dense growth of brush. Brush especially alder and willow forms an all but impenetrable wall along streams, shorelines, and hillsides to an altitude of about 2,000 feet (610 m). Ferns and ubiquitous devil's club thrive under them.

Talbot et al. (1992) distinguish three broad zones in the vegetation of the Tuxedni Wilderness Area: (1) forest communities of *Picea sitchensis* and *Populus trichocarpa* occupy small areas of the lowlands, (2) broadleaf

deciduous *Alnus crispa* thickets predominate from lower to middle elevations, and (3) microphyllous evergreen *Empetrum nigrum*-*Cassiope stelleriana* dwarf shrub heaths appear above approximately 610 m. Herbaceous vegetation occurs primarily as a mosaic of tall forb meadows and *Alnus crispa* thickets at middle elevations, beach meadows, and herb-dominated cliff walls. Mires occur in isolated depressions and along some streamlets.

The *Alnus crispa* thickets of the Tuxedni Wilderness Area correspond to the "Subalpine Zone of glaciated uplands and moist mountain valleys...(with)... a mosaic of *Alnus crispa* thickets and tall-growing grass and forb communities," described by Mitchell (1968:45) of south-central Alaska, which includes the Tuxedni area. For the oceanic boreal zone in western North America Hämet-Ahti (1976:Fig. 5) characterized an upper oroboreal zone, approximately equivalent to subalpine, by the dominance of *Alnus sinuata* (*A. crispa* subsp. *sinuata*). Similarly, Tuhkanen (1984:30), citing Hämet-Ahti (1979), describes the hyperoceanic (O<sub>2</sub>) sector in western North America: "...forests of *Alnus sinuata* are common in the middle boreal zone and especially in the upper oroboreal zone in the coastal mountains, where they form the tree-line and forest limit." Tuhkanen observed that these alder forests have been interpreted as formations homologous to the mountain birch forests (*Betula pubescens* subsp. *tortuosa* and subsp. *pubescens*) of Fennoscandia and forests of *Betula ermanii* and *Alnus kamtschatica* (*Alnus sinuata*) of Kamchatka.

### Post-glacial Vegetation

In a study of the post-glacial history of the Cook Inlet region, Ager et al. (1985) demonstrated that deglaciation started at 14,000 years B.P. but may have lagged in valleys until as late as 10,500 years B.P. Basal pollen assemblages suggest the initial vegetation types consisted of herb-shrub tundra or shrub-herb tundra dominated by *Betula* cf. *nana*, *Salix*, and Ericales. At an interval of about 10,500–9,000 years B.P., the tundra was replaced by *Populus* woodlands interspersed with *Salix* thickets and shrub tundra. *Alnus* subsequently migrated into the area about 9,500 years B.P. Boreal spruce (*Picea glauca*, *P. mariana*) incursions through the Matanuska Valley began about 8,500–8,200 years B.P. and expanded over much of the region by the mid-Holocene. Forests of *Picea sitchensis* and *Tsuga mertensiana* that presently occupy coastal areas and mountain valleys developed relatively recently, in the past 2,000 years.

### Anthropogenic Influences in the Area

Anthropogenic disturbance in the Tuxedni Wilderness Area is small except in three small areas on Chisik Island. A few minor trails exist in these areas, yet none

penetrate into the island's interior. A cannery functioned continuously from 1919 to 1948; it is located in the southwestern corner on an 8-ha parcel withdrawn from wilderness status. The cannery is no longer operational, but a resident caretaker oversees the grounds and cultivates a small garden.

On the southern tip of the island, the U.S. Coast Guard maintains a right-of-way to service marine navigational aids. A primitive, 400-m-long trail leads from the coast to the navigation aids.

The northern tip of the island is excluded from wilderness status. In this area, about 12 special use permits are issued annually to salmon set net fishers; one private residence occupies about 3 ha.

Oil drilling occurs in Cook Inlet and is expected to increase. Recent oil discoveries in the vicinity of the Tuxedni Wilderness Area will probably increase drilling and the construction of off-shore oil platforms.

## Methods

Prior to initiating field studies, we conducted a marine circumnavigation to familiarize ourselves with the study area. After a reconnaissance by boat in April 1987, color-infrared aerial photographs (scale 1:60,000) were interpreted to delineate habitat types and to identify potential sampling locations. These sites were selected to represent the totality of the environmental variation. Field studies were started in 1987, continued during summer 1988, and were completed in June 1993. During the first summer, the land reconnaissance was valuable for determining an appropriate time to begin field studies. Because 2 m of snow remained at lower elevations on Chisik Island, fieldwork was delayed until late June. The 1987 field schedule was divided into two periods to collect early- and late-flowering plants: 26 June–11 July and 24 August–5 September. Because of persistent snow cover at upper elevations, plant collecting was restricted to lower elevations during the early period. Field studies were continued in 1988 (26 August–15 September) and 1993 (10–24 June) to ensure collections at all significant sites. Collections on talus slopes, steep rock cliffs, and the northeastern coast were not comprehensive because of safety reasons. Despite these exceptions, we believe the list of species is nearly complete and further studies would add but few species.

During the 1987 field season, the investigators were based at the cannery facilities of the Wards Cove Packing Company at Snug Harbor in the southwestern corner of Chisik Island (Fig 1.; site 73). Daily forays on foot and by boat were made from this location. From a practical perspective, the use of the Snug Harbor facility greatly aided the drying of plant specimens in a wet, maritime

climate. A similar approach was used in 1988 and 1993. The same base camp was used, but we also established a field camp to facilitate collection of alpine plants at an elevation of 720 m on the northern end of Chisik Island. From this upper-elevation site, we made 3–4 day excursions after which we returned to the base camp to dry the plants.

We described the major plant communities that we observed to provide a framework for a better understanding of the habitat notes in the annotated catalog of species (Argus 1966). For comparison, community types are shown in relation to the Alaska vegetation classification (Viereck et al. 1992; Level III or IV, where possible).

### *Checklist Format*

Each species is followed by a series of descriptors: commonness rating, collection and observation site(s), geographical distribution formulae, and Raunkiaer life-form classification.

The commonness classes follow Duncan and Meacham (1986); each class is followed by a summary of the habitat. This information complements collection-site data (Fig. 1) by indicating the representativeness of collections and, in some cases, by showing the relative abundance in different habitats. Commonness classes are:

**abundant** = very likely to be encountered; nearly always found in appropriate habitats, sometimes forming dense stands;

**common** = likely to be encountered;

**uncommon** = unlikely to be encountered and sometimes not present in appropriate habitats; and

**rare** = extremely unlikely to be encountered, often not present in appropriate habitats, and often restricted to a small number of sites.

Supplemental data of sight records are often given when a species was observed but not collected. Information includes a brief description of the habitat or the name of the associated plant community. This is followed by the site elevation in meters, date of collection, and specimen collection number (in parentheses) and site location number (in brackets). With these habitat descriptions, we attempted to record the environmental range of species in the study area.

The distribution formulae of Scoggan (1978–79) show the general geographic range of each species. The formulae are divided into three parts: latitudinal distribution, longitudinal distribution, and distribution in Greenland–Europe–Asia (Table 1). In Scoggan's treatment of latitudinal zones, the Arctic is geographically equivalent to the Eskimoan

**Table 1.** Delimitation of latitudinal zones (after Scoggan 1978).

#### **Latitudinal Distribution**

- A High-arctic (this and the following symbols indicating northern limits)
- a Low-arctic
- S High-subarctic
- s Low-subarctic
- T High-temperate
- t Low-temperate

#### **Longitudinal Distribution in North America**

- X transcontinental (usually cross-Canada; range sometimes completely longitudinally in the United States)
- W confined in the North to Alaska-Yukon-western Mackenzie District-British Columbia or Alberta (with sometimes an eastward extension into the Cypress Hills region of southwestern Saskatchewan)
- WW same as W but extending eastwards to Manitoba or eastern Ontario
- EE confined in the North to Keewatin District-Manitoba or Ontario eastward
- E confined in the North to the eastern Canadian Arctic or Quebec eastward
- D disjunct distribution (the larger area usually in the West, the smaller in the East; isolated stations sometimes in the Great Lakes region).

#### **Distribution in Greenland-Europe-Asia<sup>a</sup>**

- G occurring in Greenland
- E occurring in Europe
- A occurring in Asia

<sup>a</sup>In the formulae, n, e, and w are used to indicate north, east, and west.

Biotic Province (Dice 1943). It approximately corresponds to Young's (1971) zones 3 and 4 for *low-arctic* if, in general, not extending north of the  $-15^{\circ}\text{C}$  isotherm of the mean annual temperatures, and zones 1 and 2 for *high-arctic* if extending well north of this isotherm. The Subarctic (a term Scoggan uses to refer mainly to the boreal zone) corresponds to the Hudsonian Biotic Province (Dice 1943), which is a broad zone including taiga in northern portions and continuous, dense forest-cover in the south. It comprises the region south of the Arctic and north of a line closely paralleling the  $-1.1^{\circ}\text{C}$  isotherm of the mean annual temperatures. In the west, its southernmost extension includes the Aleutian Islands, a narrow coastal strip of southern Alaska, and a small part of northeastern British Columbia. The *high-subarctic* of Scoggan (1978–79) extends northwards beyond approximately the  $-3.9^{\circ}\text{C}$  isotherm of mean annual temperatures. The *low-subarctic* occurs south of this isotherm and north of the Temperate zone; the region south of the Subarctic is the Temperate zone.

The life-form classes follow Raunkiaer (1934) and are assigned to each species based on field observations and on Scoggan (1978–79; Table 2). Life-form spectral data

were analyzed with MULVA-4 (Wildi and Orlóci 1990). The identification of life-form latitudinal relations was based on numbers of species and accomplished according to minimum variance clustering with the correlation coefficient.

The nomenclature follows Welsh (1974). A full set of voucher specimens is deposited at the Brigham Young University Herbarium.

## Results and Discussion

### Plant Communities

Broadleaf deciduous thickets of *Alnus crispa* (alder closed tall scrub; Viereck et al. 1992) predominated on well drained sites at lower to middle elevations (Figs. 4 and 5). The typical understory species in the thickets were the shrubs *Sambucus racemosa*, *Rubus spectabilis*, and *Oplopanax horridus*; the forbs *Trientalis europea*, *Veratrum eschscholtzii*, *Dryopteris austriaca*, *Gymnocarpium dryopteris*, and *Athyrium filix-femina*; and the graminoid *Calamagrostis canadensis*. Other shrub types were less abundant

**Table 2.** Raunkiaer (1934) life-form classification of vascular plants; the numbers of native Tuxedni Wilderness Area, Alaska, species and the percent of total native flora of 279 species are in brackets.

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Phanerophytes (Ph), perennating buds situated well above the ground (21, 7.5%)

- Mg Megaphanerophytes, exceeding 30 m in height (0)
- Ms Mesophanerophytes, 8–30 m in height (3, 1.0%)
- Mc Microphanerophytes, 2–8 m in height (4, 1.4%)
- N Nanophanerophytes, 0.25–2 m in height (14, 5.0%)

Chamaephytes (Ch), perennating buds situated on the surface of the ground or projecting a small distance (not more than 0.25 m) above the ground (48, 17.2%)

Hemicryptophytes (H), perennating buds situated in the upper surface layer of the soil (137, 49.1%)

- Hp Protohemicryptophytes without runners (13, 4.6%)
- Hpr Protohemicryptophytes with runners (21, 7.5%)
- Hs Hemicryptophyte, semi-rosette, without runners (54, 19.4%)
- Hsr Hemicryptophyte, semi-rosette, with runners (16, 5.7%)
- Hr Hemicryptophyte, rosette, without runners (27, 9.7%)
- Hrr Hemicryptophyte, rosette, with runners (6, 2.2%)

Cryptophytes (Cr), perennating buds entirely buried beneath the surface or the soil (geophyte, G) or lying at the bottom of the water in ponds or streams (helophyte, Hel or hydrophyte, HH) (67, 24.0%)

- Grh Rhizome geophyte, perennating bud terminating in a deep rhizome (54, 19.4%)
- Gst Stem-tuber geophyte, perennating by tubers or corms (1, 0.4%)
- Grt Root-tuber geophyte, perennating by tuberous roots (5, 1.8%)
- Gr Root geophyte, perennating buds located on fibrous roots (0)
- Gb Bulb geophyte, perennating by a bulb or bulbs (3, 1.1%)
- Gp Hemi-parasite on roots (1, 0.4%)
- Hel Helophyte, perennating buds and lower part of plant submersed or in mud (2, 0.7%)
- HH Hydrophyte, major part of plant submersed or floating (1, 0.4%)

Therophytes (T), vegetative organs completely dieback each year and whose perennating buds are entirely contained in the seeds (6, 2.2%)

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**Fig. 4.** General view of Chisik Island, Alaska, (looking south) characterized by a nearly continuous cover of *Alnus crispa* thickets with isolated stands of *Picea sitchensis*.



**Fig. 5.** Interior view of an *Alnus crispa* thicket with an understory of *Oplopanax horridus* on an alluvial fan in northwestern Chisik Island, Alaska.



**Fig. 6.** General aspect of an *Empetrum nigrum*-*Cassiope stelleriana* hummocky heath looking toward the southern end of Chisik Island, Alaska. Other characteristic species are the dwarf shrubs, *Loiseleuria procumbens*, *Luetkea pectinata*, *Salix arctica*, and *Vaccinium uliginosum*; the forbs *Erigeron peregrinus*, *Lycopodium annotinum*, and *Polygonum viviparum*; and the graminoid *Agrostis borealis*.

and included *Rubus spectabilis* thickets (closed low scrub; Viereck et al. 1992) on well drained lower slopes, *Salix planifolia* subsp. *pulchra* thickets (low willow closed low scrub; Viereck et al. 1992) on protected, well drained upper elevation sites, and *Salix barclayi* swamps (open tall scrub shrub swamp; Viereck et al. 1992).

Dwarf shrub communities achieve dominance above about 610 m. The most extensive community types were *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath (crowberry tundra ericaceous dwarf scrub; Viereck et al. 1992) on protected, moderately well drained sites (Fig. 6), *Vaccinium uliginosum* - *Empetrum nigrum* heath (*Vaccinium* tundra ericaceous dwarf scrub; Viereck et al. 1992) on slightly more exposed sites, and *Arctostaphylos alpina* - *Cladina rangiferina* heath (bearberry tundra ericaceous dwarf scrub; Viereck et al. 1992) on the most wind-exposed sites (Fig. 7). Late-melt snowbed *Luetkea pectinata* scarcely vegetated communities (alpine herb-sedge [snowbed] dry forb herbaceous; Viereck et al. 1992), occupied depressions adjacent to *Empetrum* - *Cassiope* hummocky heaths.

Herbaceous vegetation occurred primarily as tall forb meadow communities (mesic graminoid herbaceous; Viereck et al. 1992) at middle elevations in a mosaic with

*Alnus crispa* thickets (Fig. 8). Meadows were characterized by the forbs *Epilobium angustifolium*, *Veratrum eschscholtzii*, *Senecio triangularis*, and *Athyrium filix-femina* and the graminoid *Calamagrostis canadensis*. Other herbaceous vegetation included *Calamagrostis canadensis* - *Sanguisorba stipulata* meadows (bluejoint-herb mesic graminoid herbaceous; Viereck et al. 1992) along streamlets, *Epilobium angustifolium* - *Lupinus nootkatensis* meadows (mesic forb herbaceous; Viereck et al. 1992) on beach ridge deposits, *Elymus arenarius* graminoid meadows (*Elymus* dry graminoid herbaceous; Viereck et al. 1992) and *Honckenya peploides* forb meadows (halophytic herb wet meadow wet forb herbaceous; Viereck et al. 1992) along beach shores, and herb-dominated communities on steep cliff walls (forb herbaceous; Viereck et al. 1992) with the forbs *Mimulus guttatus*, *Sedum rosea*, *Artemisia tilesii*, and *Epilobium latifolium* and the graminoids *Poa macrocalyx* and *Hordeum brachyantherum* (Fig. 9).

Mire communities were relatively isolated types and occurred in poorly drained depressions. They were usually dominated by *Scirpus caespitosus* and *Sphagnum* spp. (subarctic lowland sedge-moss bog meadow and ericaceous shrub bog open low scrub; Viereck et al. 1992; Fig. 10).

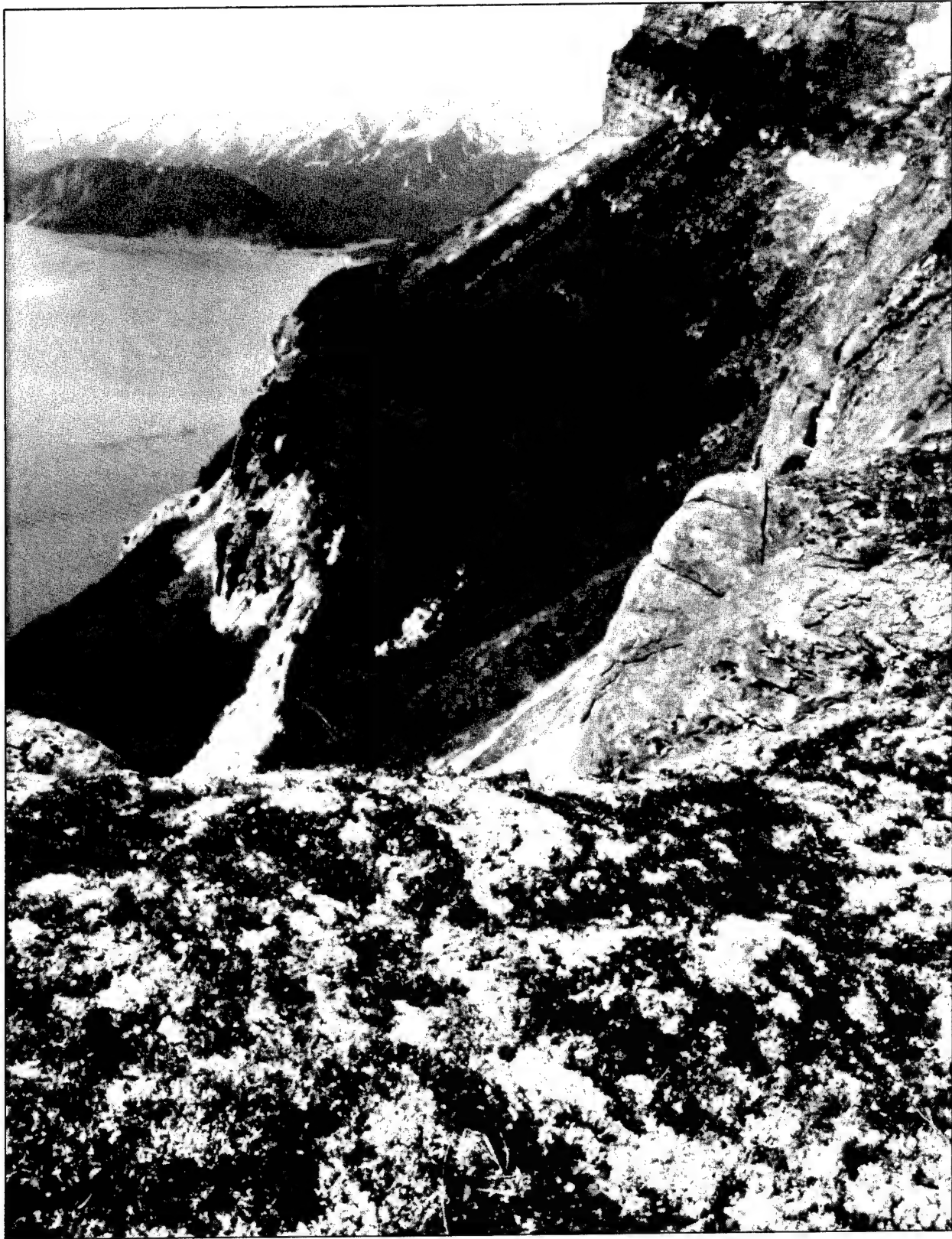


Fig. 7. An upper elevation *Vaccinium uliginosum*-*Cladina rangiferina* heath at the edge of an alpine plateau above a steep escarpment at the northern end of Chisik Island, Alaska; the Aleutian Range is in the background. Other characteristic species of the cliff margin are *Dryas octopetala*, *Lloydia serotina*, *Oxytropis nigrescens*, and *Silene acaulis*.

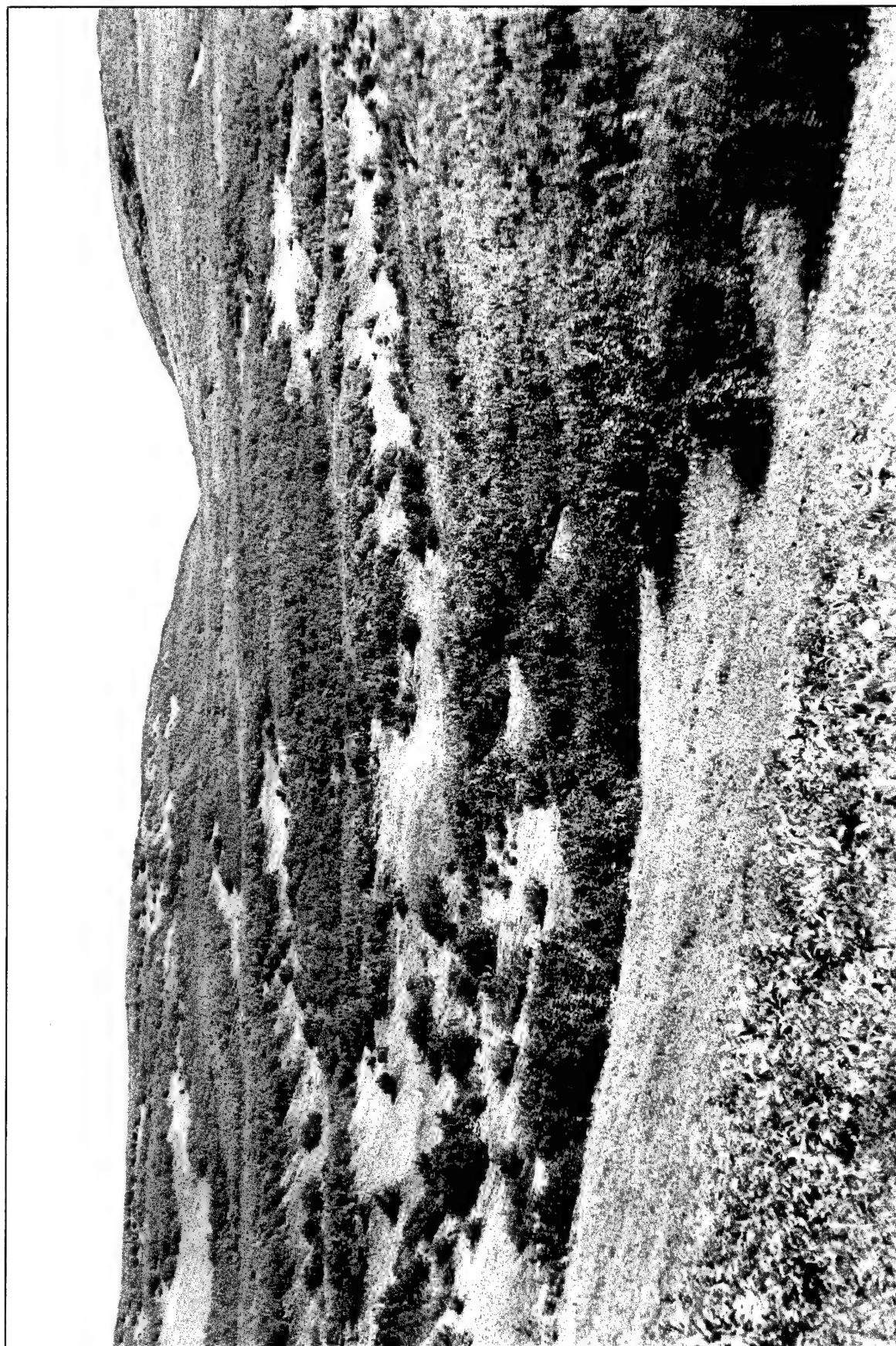


Fig. 8. Mid-elevation (550 m) mosaic of *Alnus crispa* thickets with an understory dominated by the ferns *Dryopteris austriaca* and *Athyrium filix-femina*, and tall forb meadows characterized by the forbs *Epilobium angustifolium*, *Veratrum eschscholtzii*, and *Senecio triangularis*.



Fig. 9. Herb-dominated communities occur along steep cliff walls of southwestern Chisik Island dominated by *Achillea millefolium*, *Mimulus guttatus*, and *Poa macrocalyx*.



Fig. 10. General view of a *Scirpus caespitosus* – *Sphagnum warnstorffii* mire in the foreground and a mosaic of *Alnus crispa* thickets and tall forb meadows in the background.

Characteristic mire species included the dwarf shrubs *Andromeda polifolia*, *Oxycoccus microcarpus*, and *Betula glandulosa*; the forbs *Drosera rotundifolia*, *Erigeron peregrinus*, *Gentiana douglasiana*, *Habenaria dilatata*, *Potentilla palustris*, *Spiranthes romanzoffiana*; and the graminoids *Eriophorum polystachion* and *Iris setosa*.

Forest communities were minor components of the vegetation (Fig. 11). *Picea sitchensis* forest (Sitka spruce open needleleaf forest; Viereck et al. 1992) occurred on the northernmost portion of Chisik Island on well drained sites and as isolated individuals or stands. *Populus trichocarpa* forest (black cottonwood closed broadleaf forest; Viereck et al. 1992) communities were associated with well drained glacial outwash.

### Floristic Relationships

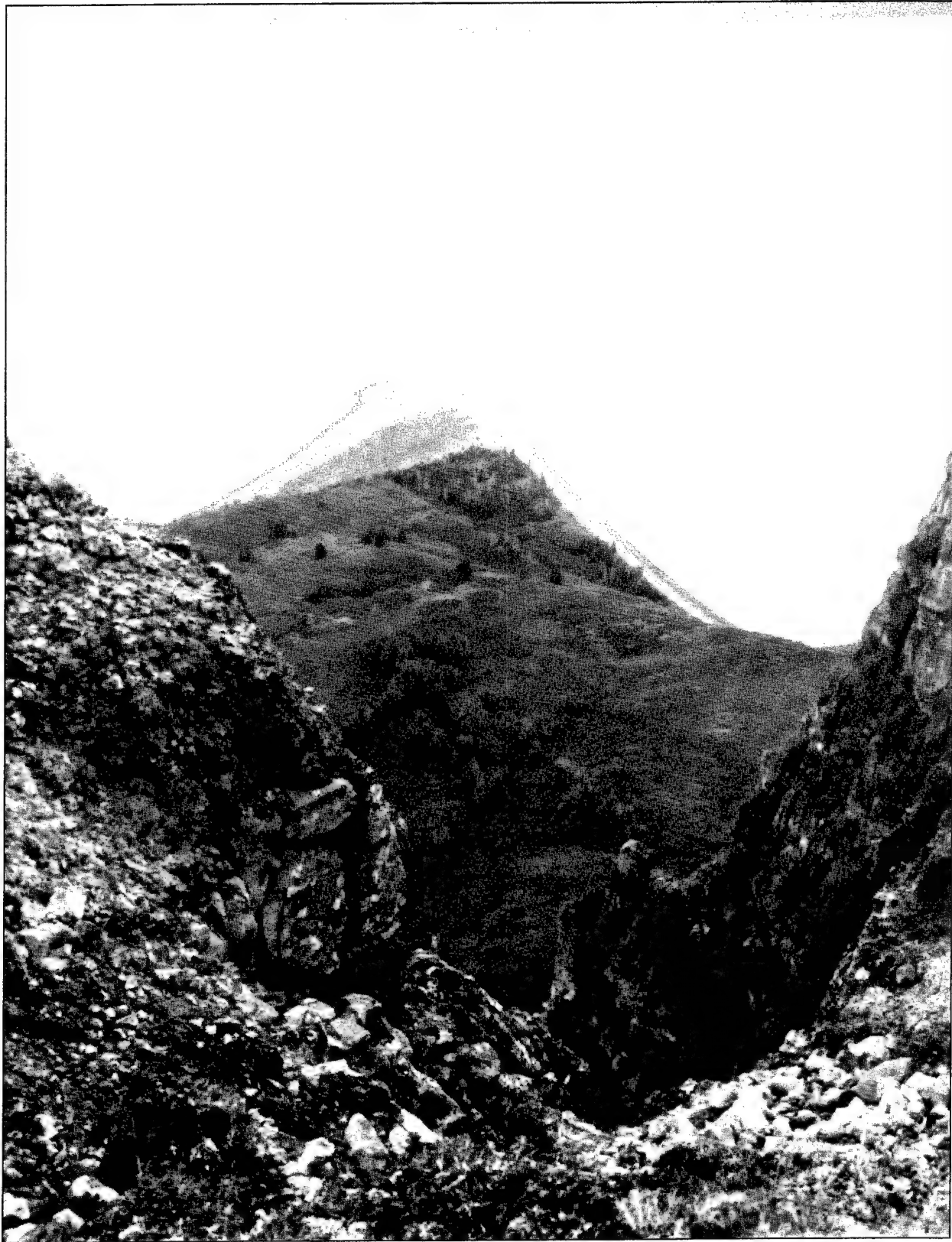
The annotated list of plants included 290 species (279 native species and 11 introduced species). In comparison with the vascular flora of other maritime islands in the hyperoceanic (O<sub>2</sub>) sector of the Alaskan middle boreal zone, the relatively small Tuxedni Wilderness Area is rich in species. For example, the total flora of the entire Kodiak Island Group (12,700 km<sup>2</sup>) approximately 250 km south

of Tuxedni is 377 species (Vincent 1964) and of the Semidi Islands (100,000 ha) 160 km southwest of Kodiak Island 202 species (Hatch 1985). The proximity of Chisik Island to the mainland and diversity of topography may in part account for its floristic richness. In contrast, the Semidi Islands and Kodiak Island are relatively isolated. The former has a low relief with a maximum elevation of 247 m, whereas the latter has a maximum elevation of 1,335 m.

Fifty families<sup>1</sup> are represented, and those with more than five species per family are listed in descending order of abundance:

Gramineae	30	Polypodiaceae	10
Cyperaceae	27	Ranunculaceae	9
Compositae	23	Juncaceae	8
Rosaceae	23	Onagraceae	8
Caryophyllaceae	13	Liliaceae	7
Ericaceae	13	Scrophulariaceae	7
Saxifragaceae	12	Lycopodiaceae	6
Salicaceae	12	Umbelliferae	6
Cruciferae	12		

<sup>1</sup> Family names follow Welsh (1974).



**Fig. 11.** The northernmost tip of Chisik Island, Alaska, viewed from the highest point on the island. Major plant community types shown at lower elevation include forests of *Picea sitchensis* and *Populus trichocarpa*, thickets of *Alnus crispa*, and coastal beach ridge meadows of *Lupinus nootkatensis* and *Epilobium angustifolium*.

**Table 3.** Percent of native Tuxedni Wilderness Area, Alaska, species and the longitudinal distribution from the transcontinental (X) to the eastern Canadian Arctic (E; after Scoggan 1978–1979). Key to symbols is shown in Table 1; no species occur in classes EE and E. Numbers of species are shown in parentheses.

Distribution	Percent	Number of species
X	59.9	(167)
W	32.2	(90)
D	5.0	(14)
WW	2.9	(8)
<b>Total</b>	100.0	(279)

Analysis of longitudinal distribution classes in North America revealed that nearly 60% of the native flora in the Tuxedni Wilderness Area was comprised of transcontinental species (Table 3). Of the remaining species, 32% were restricted to the extreme west, whereas the remainder formed only 8% of the total native flora. The latter species were wider-ranging western plants (ranging eastwards from the Pacific Coast to Manitoba or Ontario) and disjuncts (usually with their larger area of distribution in the west, the smaller in the east). In comparison, the distribution of Canadian species is 33% transcontinental, 27% extreme western, 11% wide-ranging western, 27% eastern (ranging eastward from Manitoba or Ontario), and 3% Atlantic Seaboard.

In relation to northern regional patterns nearly 37% of the Tuxedni Wilderness Area species were circumpolar, occurring in Greenland, Europe, Asia, and North America (Table 4). The second largest category, 23%, occurred in eastern Asia and was essentially Am-

**Table 4.** Percent distribution of native Tuxedni Wilderness Area, Alaska, species in circumpolar regions (after Scoggan 1978–1979). Numbers of species are shown in parentheses.

Region	Percent	Number of species
Greenland-Europe-Asia	36.6	(102)
Eastern Asia	22.9	(64)
North America	20.4	(57)
Europe-Asia	13.6	(38)
Asia	2.2	(6)
Greenland-Asia	2.2	(6)
Europe	1.0	(3)
Greenland	0.7	(2)
Greenland-Europe	0.4	(1)
<b>Total</b>	100.0	(279)

phi-Beringian. The third largest element, 20%, was endemic to North America. This category was only slightly less important than the second, and the 3% difference may be statistically insignificant. Species also occurring in both Europe and Asia formed the fourth largest class, 14%; these species are nearly circumpolar but unreported from Greenland.

Latitudinal zonation patterns seem to differ between Canada and the Tuxedni Wilderness Area (Table 5). In Canada, the number of species gradually increases with latitude, whereas in the Tuxedni Wilderness Area the increase is more rapid with relatively high percentages of high- and low-subarctic zone species, indicating their greater importance in the Tuxedni flora.

No endemic vascular species were discovered in the Tuxedni Wilderness Area, and none has been reported from the area. Thus, the flora of the Tuxedni Wilderness Area is comparatively diverse, but it is not particularly unique and contained many wide-ranging species with a strong western component. The importance of subarctic or boreal species in the flora is consistent with the latitudinal zone delimitations of Scoggan (1978–79) and Tuhkanen (1984).

An expression of the percent of various floristic elements in an area serves as a description of their relative importance, particularly when they are related to the flora of Canada. As local floras are prepared in the future, the use of circumpolar, latitudinal, and longitudinal categories may serve as distinctive representations of an area that may then be used to facilitate comparison and interpretation.

### Range Extensions

Extensions of known ranges are summarized as two groups, major and minor, according to their relative distance from known collection sites. Fourteen major range extensions were 240–720 km from known collection sites; these species included *Agrostis exarata*, *Arabis glabra*, *Atriplex patula*, *Carex membranacea*, *Coptis trifolia*, *Draba crassifolia*, *Habenaria hyperborea*, *Maianthemum dilatatum*, *Plantago macrocarpa*, *Poa leptocoma*, *Polystichum braunii*, *Puccinellia langeana*, *Sagina occidentalis*, and *Salix polaris*. Two of the species, *Arabis glabra* and *Atriplex patula*, were probably introductions but were included in the list. The range extensions mainly fill a gap along the western side of the Cook Inlet between the Prince William Sound to the southeast and the Alaska Peninsula to the west or show disjunct distribution.

Thirty minor range extensions were 90–200 km from known collection sites; these species included *Amelanchier alnifolia*, *Arnica latifolia*, *Aster subspicatus*, *Caltha leptosepala*, *Carex anthoxantha*, *C. macloviana*,

**Table 5.** Comparison of the numbers of native species in the high-arctic to temperate latitudinal zones between the Tuxedni Wilderness Area, Alaska (percentages are based on the total native flora of 279 species) and Canada (percentages are based on the total native flora of 3,269 species; Scoggan 1978, Table 1). Key: A = high-arctic, a = low-arctic, S = high-subarctic, s = low-subarctic, T = high-temperate, and t = low-temperate.

Tuxedni Wilderness Area				
A	a	S	s	T
44 (15.8%)	151 (54.1%)	227 (81.4%)	278 (99.6%)	262 (93.9%)
Aa	Ss		T	
44 (15.8%)	226 (81.0%)		262 (93.9%)	
Canada				
A	a	S	s	T
144 (4.4%)	572 (17.5%)	952 (29.1%)	1,286 (39.3%)	2,661 (81.4%)
Aa	Ss		Tt	
573 (17.5%)	1,347 (41.2%)		3,083 (94.3%)	

*C. pyrenaica*, *C. sitchensis*, *C. spectabilis*, *Cinna latifolia*, *Draba borealis*, *D. stenoloba*, *Empetrum nigrum* subsp. *hermaphroditicum*, *Epilobum ciliatum*, *Erysimum inconspicuum*, *Fragaria chiloensis*, *Geum calthifolium*, *Hieracium triste*, *Hippuris montana*, *Juncus drummondii*, *Lycopodium sitchense*, *Populus trichocarpa*, *Potentilla pensylvanica*, *Ribes laxiflorum*, *Saxifraga punctata* var. *nelsoniana*, *Spergularia canadensis*, *Stellaria longipes* s. str., *S. longifolia*, *Tellima grandifolia*, and *Woodsia scopulina*. These species included generally westward extensions from the Kenai Peninsula, southern extensions from the upper Cook Inlet area, and eastward extensions from the upper Alaska Peninsula.

By filling in distributional gaps, these new records from the Tuxedni Wilderness Area aid the interpretation of possible migration routes. The geographic position of the area along the northernmost edge of the Gulf of Alaska shows phytogeographic relations with sources from three regions: Asia via the Aleutian Islands, interior Alaska, and the Pacific Coastal and Rocky Mountain regions of North America.

### Introduced Species

Twelve species were introduced: *Aquilegia formosa*, *Arabis glabra*, *Aster sibiricus*, *Atriplex patula*, *Capsella bursa-pastoris*, *Matricaria matricarioides*, *Poa annua*, *Rhinanthus crista-galli*, *Rosa rugosa*, *Stellaria media*, *Taraxacum officinale*, and *Trifolium repens*. These species were either associated with anthropogenically disturbed sites as weeds or were planted on the cannery

grounds. Most of these introduced species—except *Taraxacum officinale*—do not seem to have spread into the surrounding terrain. *Taraxacum officinale* is invading the colluvial, rubble slopes south of the old cannery. Thus, introduced species have played a minor role in the Tuxedni Wilderness Area flora and are almost entirely restricted to centers of habitation.

### Life-forms

The biological spectrum serves as a display of floristic diversity (Emberger 1966) and as an indicator of climate, which is categorized by the departure of life-form classes from the normal spectrum (Raunkiaer 1934). Its biological spectrum placed the Tuxedni Wilderness Area in the boreal zone of Raunkiaer, generally equivalent to the subarctic zone of Scoggan (1978–79), which lies between the 10% and 20% chamaephyte boundary (Table 6). The flora of the Tuxedni Wilderness Area showed a strong tendency toward higher species richness in the lower strata where life-forms would be least exposed because of persistent snow cover. In contrast, a more even distribution of species richness in phanerophytic subdivisions or higher concentration of mesophanerophytes has been demonstrated in milder climatic regions, for example, in southern Quebec (LeBlanc 1963), in the eastern United States (Ennis 1928), and in Minnesota (Buell and Cantlon 1951).

Cluster analysis of the life-form spectrum latitudinal zone data with MULVA-4 revealed two main groups: arctic

**Table 6.** Life-form spectra of native spermatophyte flora of the Tuxedni Wilderness Area, Alaska, in relation to other regions. Values are in percent of the flora and are followed by number of species in parentheses. Key: Ph = phanerophyte, Ch = chamaephyte, H = hemicryptophyte, Cr = cryptophyte, and T = therophyte.

	Life-form classes				
	Ph	Ch	H	Cr	T
Tuxedni	8.1 (21)	16.3 (42)	50.4 (130)	22.9 (59)	2.3 (6)
Normal spectrum <sup>a</sup>	46.0	9.0	26.0	6.0	13.0
Canada <sup>b</sup>					
High-arctic	0.0 (0)	27.7 (38)	54.0 (74)	17.5 (24)	0.7 (1)
Low-arctic	4.1 (22)	20.2 (108)	50.2 (268)	21.7 (116)	3.7 (20)
High-subarctic	8.0 (73)	15.5 (141)	48.9 (446)	22.8 (208)	4.8 (44)
Low-subarctic	9.5 (117)	13.0 (159)	48.5 (594)	23.3 (286)	5.7 (70)
High-temperate	11.8 (303)	7.5 (193)	47.5 (1217)	23.4 (600)	9.8 (250)

<sup>a</sup> World (Raunkiaer 1934).

<sup>b</sup> Latitudinal zones of Canada (Scoggan 1978–79).

and non-arctic (Fig. 12). The non-arctic group consisted of temperate and subarctic subgroups. The Tuxedni Wilderness Area is clustered with the subarctic subgroup and shows a slightly higher similarity to the high-subarctic than to the low-subarctic subgroup. Thus, data analysis based on two different approaches, life-forms and species, revealed generally similar and consistent results; these suggest the relatively high importance of subarctic elements in the study area. Future studies of local floras in northern regions may benefit from the use of life-form spectra and species distribution patterns as diagnostic variables to facilitate comparison and interpretation between floras.

### Annotated Catalog of Vascular Plants

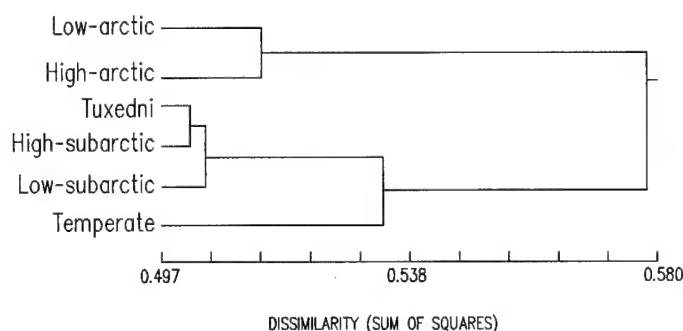
The higher plant categories are arranged in phylogenetic sequence in the checklist, but families, genera, species, and infraspecific taxa are in alphabetical order.

### Lycopsidea

#### Lycopodiaceae Clubmoss Family

*Lycopodium alpinum* L. (*Diphasiastrum alpinum*). Alpine Club Moss. Common in moist alpine heaths; snowbed meadow, 610 m, 26 August 1987 (#635 [35]); observed in *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 [26]; *Luetkea pectinata* - *Geranium erianthum* mixed low forb meadow, 396 m, 5 September 1988 [46]; *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 [18]; /aST/X/GEA/ (Ch).

*Lycopodium annotinum* L. Stiff Club Moss. Common in deciduous alder and willow thickets, moist alpine tundra, and mires; cliff margin at summit, 823 m, 5 September 1987 (#1040 [11]); *Alnus crispa* thicket, 610 m, 26 August 1987 (#656 [35]); *Cladina rangiferina* - *Arctostaphylos alpina* tundra, 610 m, 26 August 1987



**Fig. 12.** Dendrogram showing the relation of the Tuxedni Wilderness Area, Alaska, with life-form spectra in the latitudinal zones of Canada (Scoggan 1978).

(#620 [35]); short sedge mire, 244 m, 6 July 1987 (#359 [55]); well-drained *Vaccinium ovalifolium* - *Spiraea beauverdiana* dwarf scrub, 128 m, 29 June 1987 (#87002-9 [63]); *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 (#88033-9 [36]); *Empetrum nigrum* - *Vaccinium uliginosum* hummocky heath, 671 m, 14 September 1988 (#88070-11 [32]); observed in *Picea sitchensis* - *Oplopanax horridus* forest, 6 m, 3 July 1987 [7]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 744 m, 3 September 1988 [15]; *Alnus crispa* - *Spiraea beauverdiana* thicket, 475 m, 4 September 1988 [46]; *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; /aST/X/GEA/ (Ch).

*Lycopodium clavatum* L. (*Diphasiastrum clavatum*). Running Club Moss. Uncommon in dry and moist alpine heaths; *Cladina rangiferina* - *Arctostaphylos alpina* tundra, 610 m, 26 August 1987 (#616 [32]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 671 m, 14 September 1988 [32]; /aST/X/GEA/ (Ch).

*Lycopodium complanatum* L. (*Diphasiastrum complanatum*). Ground Cedar. Uncommon in deciduous dwarf scrub; well-drained *Vaccinium ovalifolium* - *Spiraea beauverdiana* dwarf scrub, 128 m, 29 June 1987 (#87002-10 [63]); /aST/X/GEA/ (Ch).

*Lycopodium selago* L. (*Huperzia selago*). Mountain Club Moss. Uncommon in rock outcrops and alpine heaths; mesic shady stream canyon, 12 m, 29 June 1987 (#529[80]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 655 m, 13 September 1988 [32]; /aST/X/GEA/ (Ch).

*Lycopodium sitchensis* L. (*Diphasiastrum sitchensis*). Sitka Club Moss. Uncommon in alpine forb meadows; *Luetkea pectinata* - *Geranium erianthum* low forb meadow, 396 m, 5 September 1988 (#88039-7 [46]); /ST/X/EA/ (Ch). This record extends its known range 150 km southwestward from Anchorage (Hultén 1968). The Chisik Island collection demonstrates that the apparent gap in the distribution of this plant between the Aleutians and the Prince William Sound area (Hultén 1941), at least in the northern part of its range, is due to insufficient knowledge.

## Sphenopsida

### Equisetaceae Horsetail Family

*Equisetum arvense* L. Field Horsetail. Common in mires and wet and mesic meadows; escarpment base, 3 m, 1 July 1987 (#167 [68]); drainage channel in snowbed meadow, 610 m, 26 August 1987 (#652 [35]); moist cliff on mineral soil, 12 m, 27 August 1987 (#578 [61]);

*Populus trichocarpa* forest, 64 m, 9 July 1987 (#87040-7 [28]); *Heracleum lanatum* tall forb meadow on colluvial debris, 12 m, 30 June 1987 (#87008-8 [79]); *Salix planifolia* subsp. *pulchra* swamp, 311 m, 5 September 1988 (#88046-1 [54]); *Calamagrostis canadensis* - *Heracleum lanatum* meadow, 53 m, 10 June 1993 (#T3211-5 [83]); observed in *Salix barclayi* - *Carex saxatilis* swamp, 119 m, 4 July 1987 [55]; /AST/X/GEA/ (Grh).

*Equisetum fluviatile* L. Water Horsetail. Uncommon in mires and marshes; *Eriophorum polystachion* - *Sphagnum russowii* mire, 37 m, 11 September 1988 (#88060-X-1 [10]); *Hippuris vulgaris* marsh, 335 m, 5 September 1988 (#1308 [17]); /aST/X/EA/ (Grh(Hel)).

*Equisetum sylvaticum* L. Wood Horsetail. Uncommon in deciduous thickets; *Salix* scrub at mire margin, 118 m, 4 July 1987 (#262 [55]); *Alnus crispa* thicket, 27 m, 11 September 1988 (#1405 [10]); /aST/X/GEA/ (Grh).

*Equisetum variegatum* Schleich. Variegated Horsetail. Rare in mires; *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-5 [10]); /AST/X/GEA/ (Grh).

## Pteropsida Filicineae

### Ophioglossaceae Adders Tongue Family

*Botrychium lunaria* (L.) Sw. Moonwort. Rare in dry coastal meadows; *Lupinus nootkatensis* - *Achillea millefolium* beach ridge meadow, 2 m, 11 June 1993 (T3222-16 [2]); /aST/X/GEA/ (Grh).

### Polypodiaceae Common Fern Family

*Athyrium filix-femina* (L.) Roth. Lady Fern. Abundant in alder thickets, open salmonberry thickets, forests, and low to mid-elevation mesic meadows; wet *Alnus crispa* - *Athyrium filix-femina* swamp, 122 m, 29 June 1987 (#87003-6 [66]); *Calamagrostis canadensis* - *Athyrium filix-femina* meadow, 61 m, 9 July 1987 (#87038-2 [5]); observed in *Alnus crispa* - *Oplopanax horridus* thicket, 3 m, 1 July 1987 [21]; *Picea sitchensis* - *Oplopanax horridus* forest, 6 m, 3 July 1987 [7]; *Alnus crispa* - *Athyrium filix-femina* thicket, 37 m, 9 July 1987 [4]; *Rubus spectabilis* - *Athyrium filix-femina* scrub, 44 m, 9 July 1987 [5]; *Populus trichocarpa* - *Gymnocarpium dryopteris* forest, 62 m, 9 July 1987 [6]; *Alnus crispa* - *Dryopteris austriaca* thicket, 408 m, 5 September 1987 [31]; *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 [46]; *Calamagrostis canadensis* - *Sanguisorba stipulata* tall forb meadow, 317 m, 5 September 1988 [52]; *Heracleum lanatum* - *Senecio triangularis* tall forb meadow, 610 m, 6 September 1988 [53]; /aST/X/EA/ (Hr).

*Cryptogramma crista* (L.) R. Br. Parsley Fern. Common in rock outcrops; rock crevice, 30 m, 27 June 1987 (#1 [64]); /aST/(X)/EA/ (Hr).

*Cystopteris fragilis* (L.) Bernh. Fragile Fern. Common in rock outcrops; escarpment base, 3 m, 1 July 1987 (#165 [64]); rock crevice in escarpment, 6 m, 30 June 1987 (#210 [64]); cliff face, 12 m, 27 August 1987 (#606 [64]); rock crevice in mesic shady stream canyon, 12 m, 26 August 1987 (#528, 502 [80]); crevice in rock outcrop, 7 m, 20 June 1993 (#4033 [84]); /aST/X/GEA/ (Hr).

*Dryopteris austriaca* (Jacq.) Woytar ex Schinz and Thell. (*D. expansa*). Spinulose Shield-Fern. Abundant in deciduous alder and salmonberry scrub, forests; rock crevice in mesic shady stream canyon, 13 m, 26 August 1987 (#531 [80]); base of rock cliff, 61–121 m, 27 June 1987 (#5, 6 [64]); observed in *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 701 m, 3 September 1988 [15]; *Alnus crispa* - *Dryopteris austriaca* thicket, 146 m, 29 June 1987 [4]; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 [28]; *Picea sitchensis* - *Oplopanax horridus* forest, 6 m, 3 July 1987 [7]; *Alnus crispa* - *Oplopanax horridus* thicket, 1 m, 1 July 1988 [28]; *Rubus spectabilis* - *Calamagrostis canadensis* thicket, 27 m, 6 July 1988 [82]; *Alnus crispa* - *Spiraea beauverdana* thicket, 475 m, 4 September 1988 [46]; /aST/X/GEA/ (Hr(Grh)).

*Gymnocarpium dryopteris* (L.) Newman. Oak Fern. Common in alder thickets, mesic meadows, and forests; base of rock cliff, 61 m, 27 June 1987 (#3 [68]); observed in *Alnus crispa* - *Dryopteris austriaca* thicket, 122 m, 4 July 1987 [55]; *Calamagrostis canadensis* - *Rubus spectabilis* meadow, 29 m, 6 July 1987 [82]; *Alnus crispa* - *Rubus spectabilis* thicket, 29 m, 6 July 1987 [82]; *Alnus crispa* - *Athyrium filix-femina* thicket, 37 m, 9 July 1987 [5]; *Rubus spectabilis* thicket, 136 m, 9 July 1987 [5]; *Calamagrostis canadensis* - *Athyrium filix-femina* meadow, 6 m, 9 July 1987 [5]; *Populus trichocarpa* - *Gymnocarpium dryopteris* forest, 62 m, 9 July 1987 [6]; /aST/X/GEA/ (Grh).

*Matteuccia struthiopteris* (L.) Todaro. Ostrich Fern. Uncommon in alder thickets on alluvial fans; known only from the northern end of Chisik Island; *Alnus crispa* - *Oplopanax horridus* deciduous thicket on alluvial fan, 67 m, 22 June 1993 (#4047A [6]); /sT/X/EA/ (Grh).

*Polystichum braunii* (Spencer) Fee. Braun Holly Fern. Uncommon in deciduous alder thickets and black cottonwood forests where it is associated with glacial till at lower elevations; *Populus trichocarpa* forest, 3 m, 1 July 1987 (#87016-6 [28]); observed in *Alnus crispa* - *Oplopanax horridus* thicket, 59 m, 9 July 1987 [5];

*Populus trichocarpa* - *Sambucus racemosa* forest, 63 m, 9 July 1987 [6]; /sT/(X)/EA/ (Hr). In Alaska the distribution of this species is concentrated in the south-east; disjunct populations are in the Prince William Sound, on Unga Island, on Attu Island (Hultén 1968), and in Kulik Lake (north of Dillingham [Hultén 1973]). The isolated records from Chisik Island, about 360 km from the Prince William Sound site, helps to fill in the scattered western distribution.

*Thelypteris phegopteris* (L.) Slosson in Rydb. (*Phegopteris connectilis*). Long Beach Fern. Common in mesic meadows and uncommon in alder scrub; base of rock cliff, 61 m, 27 June 1987 (#4 [68]); observed in *Athyrium filix-femina* - *Calamagrostis canadensis* tall forb meadow, 469 m, 4 September 1988 [51]; *Epilobium angustifolium* - *Calamagrostis canadensis* tall forb meadow, 436 m, 4 September 1988 [51]; *Senecio triangularis* - *Calamagrostis canadensis* tall forb meadow, 402 m, 4 September 1988 [51]; /aST/X/GEA/ (Grh).

*Woodsia ilvensis* (L.) R. Br. Rusty or Fragrant Woodsia. Uncommon in rock outcrops; rock outcrop, 549 m, 26 August 1987 (#672 [34]); /aST/X/GEA/ (Hr).

*Woodsia scopulina* D. C. Eaton. Rocky Mountain Woodsia. Uncommon in open rock outcrops; rock crevice, 61 m, 27 June 1987 (#2 [65]); rock outcrop, 610 m, 13 June 1993 (#4015 [31]); /sT/D/-/ (Hr). The disjunct record of this fern is part of a disrupted pattern (Hultén 1941); other disjunct sites in Alaska are on the southeastern Kenai Peninsula and in the Haines area in southeastern Alaska (Hultén 1968).

## Pteropsida Gymnospermae

### Pinaceae Pine Family

*Juniperus communis* L. Common Juniper. Common in open rock outcrops; rock outcrop, 91 m, 27 June 1987 (#174 [65]); /aST/X/GEA/ (Ch(N)).

*Picea glauca* (Moench) Voss. White Spruce. Rare in alder thickets at upper elevation; open *Alnus crispa* scrub, 610 m, 3 September 1988 (#1271 [40]); /ST/X/-/ (Mc).

*Picea sitchensis* (Bong.) Carr. Sitka Spruce. Uncommon on till and concentrated on the northern end of the island; *Picea sitchensis* slope forest, 30 m, 9 July 1987 (#464 [7]); *Picea sitchensis* forest, 6 m, 8 September 1988 (#1377 [7]); observed as isolated forest fragments in *Alnus crispa* thickets; /sT/W/-/ (Ms).

## Pteropsida Angiospermae - Dicotyledoneae

### Araliaceae Ginseng Family

*Oplopanax horridus* (J. E. Smith) Miq. Devils Club. Abundant in mesic, shady alder thickets and forests, particu-

larly along drainageways; *Alnus crispa* thicket, 6 m, 8 July 1987 (#400C [73]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 122 m, 29 June 1987 [66]; *Alnus crispa* - *Dryopteris austriaca* thicket, 146 m, 29 June 1987 [63]; open *Alnus crispa* - *Calamagrostis canadensis* scrub, 189 m, 29 June 1987 [62]; *Alnus crispa* - *Oplopanax horridus* thicket, 3 m, 1 July 1987 [28]; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 [28]; *Picea sitchensis* - *Oplopanax horridus* forest, 6 m, 3 July 1987 [7]; /sT/D/eA/ (N(Mc)).

#### Betulaceae Birch Family

*Alnus crispa* (Ait.) Pursh var. *crispa*. Green Alder. Abundant on mesic sites at low to mid-elevations; *Alnus crispa* thicket, 6 m, 8 July 1987 (#401 [73]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 122 m, 29 June 1987 [66]; *Alnus crispa* - *Dryopteris austriaca* thicket, 146 m, 29 June 1987 [63]; open *Alnus crispa* - *Calamagrostis canadensis* scrub, 189 m, 29 June 1987 [62]; *Alnus crispa* - *Oplopanax horridus* thicket, 3 m, 1 July 1987 [28]; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 [28]; *Picea sitchensis* - *Oplopanax horridus* forest, 6 m, 3 July 1987 [7]; /aST/X/GEA/ (Mc(N)).

*Betula glandulosa* Michx. Glandular Birch. Common in mires and alpine heath; *Scirpus caespitosus* slope mire, 122 m, 4 July 1987 (#87024-4 [55]); observed in *Carex limosa* - *Sphagnum girgensohnii* mire, 119 m, 4 July 1987 [55]; *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; *Arctostaphylos alpina* - *Cladina rangiferina* heath, 530 m, 5 September 1988 [36]; *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; /aST/X/G/ (Ch(N)).

*Betula papyrifera* Marsh. Paper Birch. Rare with open Sitka spruce forests and only seen on the northern portion of Chisik Island; open *Picea sitchensis* slope forest, 30 m, 9 July 1987 (#465A [7]); /ST/X/-/ (Ms).

#### Boraginaceae Borage Family

*Mertensia maritima* (L.) S. F. Gray. Oysterleaf. Rare in coastal beaches; coastal sandy beach, 1.5 m, 8 September 1988 (#1366 [8]); /aST/X/GEA/ (Hp).

*Myosotis sylvatica* Hoffm. Forget-me-not. Common in open, lower elevation cliff sites; *Taraxacum officinale* colluvial debris slope, 9 m, 30 June 1987 (#87009-2 [79]); also seen on cliff walls above Tuxedni Channel [76]; /aST/WW/EA/ (Hs).

#### Campanulaceae Bellflower Family

*Campanula lasiocarpa* Cham. Mountain Harebell. Uncommon in alpine heaths, short herb alpine meadows,

and outcrops; cliff margin at summit, 792 m, 5 September 1987 (#1038, 610 [12]); rock outcrop, 580 m, 28 August 1987 (#1201 [34]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* heath, 701 m, 14 September 1988 [24]; *Vaccinium uliginosum* - *Cladina stellaris* heath, 823 m, 30 August 1988 [12]; *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 [26]; *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 [14]; /aST/W/eA/ (Hsr).

#### Caprifoliaceae Honeysuckle Family

*Linnaea borealis* L. Twin-flower. Common in alpine low willow thickets and uncommon in mesic meadows; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#320 [81]); open *Picea sitchensis* forest, 6 m, 3 July 1987 (#87020-20 [7]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 744 m, 3 September 1988 [15]; /aST/X/GEA/ (Ch, evergreen).

*Sambucus racemosa* L. subsp. *pubescens* (Michx.) House var. *arborescens* (T. and G.) Gray. Red Elderberry. Common in alder scrub at low to mid-elevation; margin of *Alnus crispa* thicket, 121 m, 27 June 1987 (#22 [66]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 61 m, 5 September 1987 [29]; *Alnus crispa* - *Dryopteris austriaca* thicket, 122 m, 5 September 1987 [30]; /sT/X/EA/ (N).

*Viburnum edule* (Michx.) Raf. Highbush Cranberry. Common in open low deciduous scrub at low elevation and uncommon in alder thickets; *Alnus crispa* thicket, 61 m, 27 June 1987 (#8 [69]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 37 m, 9 July 1987 [4]; /ST/X/-/ (N).

#### Caryophyllaceae Pink Family

*Arenaria lateriflora* L. (*Moehringia lateriflora*). Blunt-leaved Sandwort. Uncommon in mesic meadows; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#322 [81]); *Geranium erianthum* - *Artemisia norvegica* low forb meadow, 430 m, 6 September 1988 (#1327 [42]); *Lupinus nootkatensis* - *Epilobium angustifolium* beach meadow, 4 m, 11 June 1993 (#T3219-10 [2]); /ST/X/EA/ (Hpr).

*Arenaria macrocarpa* Pursh. Long-podded Sandwort. Uncommon in alpine, wind-exposed heaths; summit margin at top of cliff, 600 m, 13 June 1993 (#4014 [12]); *Vaccinium uliginosum* heath, 600 m, 17 June 1993 (#4024 [13]); /aSs/W/EA/ (Ch).

*Arenaria peploides* L. (*Hockenya peploides*). Sea-beach Sandwort. Common at the leading edge of coastal

- beach vegetation; coastal beach gravel, sea level, 27 June 1987 (#13 [68]); /aST/X/GEA/ (Grh(Hpr)).
- Cerastium arvense* L. Field Chickweed. Common on cliffs and colluvial debris at base of cliffs; *Taraxacum officinale* low forb colluvial debris slope, 9 m, 30 June 1987 (#87009-6 [79]); *Mimulus guttatus* escarpment, 1.5 m, 7 July 1987 (#87032-10, 87032-21 [76]); base of escarpment, 6 m, 30 June 1987 (#204 [68]); /ST/X/GEA/ (Ch).
- Sagina occidentalis* Wats. Western Pearlwort. Common on low cliff ledges; moist cliff, 12 m, 27 August 1987 (#579 [61]); marine cliff ledge, 5 m, 21 June 1993 (#4040A [64]); /ST/W/-/ (T(Hs)). This isolated record fills the gap between the collections in southeastern Alaska and the western Alaska Peninsula (Hultén 1968), extending the known range about 720 km from the nearest known site on Unga Island.
- Silene acaulis* L. Moss Campion. Uncommon in open, alpine heaths along summit cliffs and ledges; summit cliff, 823 m, 5 September 1987 (#1025 [11]); /AST/X/GEA/ (Ch).
- Spergularia canadensis* (Pers.) G. Don. Canada Sand-spurry. Uncommon in brackish marshes; *Triglochin maritima* graminoid marsh, sea level, 30 June 1987 (#87007-50 [27]); tidal mud flat, sea level, 9 September 1988, (#1393B [76]); /sT/D(coastal)/-/ (T) This is an extension of the known range of about 100 km westward across the Cook Inlet from the localities mapped by Hultén (1968).
- Stellaria calycantha* (Ledeb.) Bong. Northern Starwort. Common in a wide variety of habitats from sea level to alpine and from wet marshes to mesic meadows, blueberry heaths, and low willow scrub; *Vaccinium uliginosum* - *Cornus suecica* dwarf shrub tundra; 610 m, 26 August 1987 (#621 [35]); well drained *Vaccinium ovalifolium* - *Spiraea beauverdiana* dwarf scrub, 128 m, 29 June 1987 (#87002-21 [66]); *Elymus arenarius* beach ridge, 1.8 m, 3 July 1987 (#87018-5 [3]); mesic shady stream canyon on mineral soil at stream margin, 12 m, 26 August 1987 (#530 [80]); *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* dwarf thicket, 701 m, 3 September 1988 (#88020-14 [19]); *Heracleum lanatum* - *Senecio triangularis* tall forb meadow, 305 m, 6 September 1988 (#88050-21 [53]); *Carex lyngbyei* marsh, 3 m, 9 September 1988 (#88056-6 [27]); *Vaccinium uliginosum* heath, 512 m, 4 September 1988 (#1298A [34]); spring mire in canyon, 518 m, 6 September 1988 (#1322D [45]), streamside, 366 m, 6 September 1988 (#1325B [53]); streambed, 24 m, 9 September 1988 (#1390D [22]); /aST/X/GEA/ (Hpr).
- Stellaria crispa* Cham. and Schlecht. Crisp Starwort. Uncommon in upper elevation low willow scrub and crowberry heath; *Salix planifolia* subsp. *pulchra* swamp, 311 m, 5 September 1988 (#88046-10 [54]); *Empetrum nigrum* heath, 506 m, 4 September 1988 (#1295P, 1295S [40]); /sT/W/-/ (Hpr).
- Stellaria humifusa* Rottb. Low Chickweed. Rare in tidal marshes; *Triglochin maritima* tidal marsh, sea level, 30 June 1987 (#87007-4 [27]); /AST/X/GEA/ (Ch(Hpr)).
- Stellaria longifolia* Muhl. ex Willd. Long-leaved Starwort. Uncommon in wet meadows and disturbed sites; in disturbed sites around cannery, 6 m, 8 July 1987 (#403A [73]); in edge of tidal marsh by cannery, 1 m, 10 September 1988 (#1398 [75]); /ST/X/EA/ Hpr(Ch) This is the westernmost record of the species in Alaska, extending the known range about 140 km from the nearest known location in Anchorage (Hultén 1968).
- Stellaria longipes* Goldie. Long-stalked Starwort. Common in deciduous low scrub and alpine cliff ledges; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#322A [81]); *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* dwarf thicket, 744 m, 3 September 1988 (#88018-9 [18]); eroding cliff near summit, 792 m, 30 August 1988 (#1209A [11]); *Empetrum nigrum* heath, 610 m, 3 September 1988 (#1270C [35]); /AST/X/GEA/ (Hpr(Ch)). This record extends the known range about 150 km into the upper Alaska Peninsula (Hultén 1968); it is seemingly unreported from the Alaska and Kenai peninsulas. However, if *S. longipes* is treated in the broad sense, it occurs on both peninsulas. Chinnappa and Morton (1984) showed it to be a variable taxon, best treated in the broad sense to include *S. laeta*, *S. monantha*, *S. edwardsii*, and others.
- Stellaria media* (L.) Villars. Common Chickweed. Rare in anthropogenically disturbed sites; disturbance site at cannery, 6 m, 2 September 1988 (#1231 [73]); introduced weed.
- Chenopodiaceae Goosefoot Family
- Atriplex patula* L. Spearscale. Rare in coastal beaches; coastal sandy shore, 1.5 m, 9 September 1988 (#1392A [27]); /ST/X/EA/ (T) In Alaska this species is described as an introduced weed and only reported from Skagway (Hultén 1968) approximately 960 km south of the Tuxedni Wilderness Area.
- Compositae (Asteraceae) Composite Family
- Achillea millefolium* L. Yarrow. Common in coastal beach meadow sites with *Elymus mollis*, *Lathyrus maritimus*, and *Angelica lucida*; *Mimulus guttatus* escarpment, 2 m, 7 July 1987 (#87032-3 [76]); *Rubus spectabilis* thicket, 61 m, 27 June 1987 (#24A [65]); /aST/X/EA/ (Hsr).

*Antennaria alpina* (L.) Gaertn. Alpine Pussytoes var. *compacta* (Malte) Welsh. Common in alpine heaths, early snowbed meadows, and alpine rock outcrops; rock outcrop at margin of snowbed meadow, 610 m, 26 August 1987 (#641 [35]); gravelly *Luetkea pectinata* snowbed, 549 m, 5 September 1987 (#909 [35]); *Empetrum nigrum* - *Cassiope stelleriana* heath, 677 m, 31 August 1987 (#88007-21 [19]); margin of late-melt snowbed, 683 m, 1 September 1988 (#1216, 1225 [25]); streamside cliff, 518 m, 4 September 1988 (#1279B [57]); cliff margin, 633 m, 13 June 1993 (#4030A [35]); /ASs/(X)/?GEA/ (Ch).

*Antennaria monocephala* DC. One-headed Pussytoes. Rare in rocky, alpine sites; eroding cliff margin, 634 m, 3 September 1988 (#1261A [11]); summit margin at top of cliff, 820 m, 13 June 1993 (#4021 [12]); /ASs/(X)/GeA/ (Ch).

*Antennaria umbrinella* Rydb., sens. lat. Umber Pussytoes. Rare in alpine cliff ledges; cliff margin at summit, 808 m, 30 August 1988 (#1205D [11]); /ST/X/-/ (Ch).

*Arnica amplexicaulis* Nutt. var. *prima* (Maguire) B. Boivin. Rare in stream gravel; streamside gravel, 314 m, 6 September 1988 (#1348 [57]); /ST/W/-/ (Hpr).

*Arnica latifolia* Bong. Mountain Arnica. Common in alpine, short herb snowbed meadows; snowbed forb meadow, 610 m, 26 August 1987 (#644 [35]); late-melt snowbed, 549 m, 5 September 1987 (#916 [38]); /ST/W/-/ (Hsr). This record extends the known range across the the Cook Inlet about 90 km (Hultén 1968) and is apparently the first record for the upper Alaska Peninsula.

*Arnica lessingii* Greene. Uncommon in alpine heath; *Cladina rangiferina* - *Arctostaphylos alpina* heath, 823 m, 30 August 1988 (#88002-34 [12]); *Empetrum nigrum* - *Vaccinium uliginosum* hummocky heath, 701 m, 14 September 1988 (#88068-10 [24]); rock outcrop, 792 m, 30 August 1988 (#1202C [11]); /Ss/W/eA/ (Hsr).

*Artemisia norvegica* Fries var. *saxatilis* (Besser) Jeps. (*A. arctica*). Mountain Sagewort. Common in mesic alpine heath and meadows; alpine *Cladina rangiferina* - *Arctostaphylos alpina* tundra, 610 m, 26 August 1987 (#619 [12]); /aST/W/eA/ (Hs).

*Artemisia tilesii* Ledeb. Aleutian Mugwort var. *unalaschensis* Besser. Common at bases of cliffs and anthropogenically disturbed sites; disturbed sites around cannery, 6 m, 8 July 1987 (#385 [73]); base of escarpment, 3 m, 28 June 1987 (#139 [64]); /aST/(X)/EA/ (Hpr).

*Aster sibiricus* L. Siberian Aster. Rare and introduced in garden; cultivated in cannery garden, 6 m, 8 July 1987 (#400A [73]); introduced (/aST/W/EA/ [Hpr]). This

species is reported from Lake Clark National Park (Racine and Young 1978) where it grows as a native species throughout the Park.

*Aster subspicatus* Nees. Douglas Aster. Common in mires and mesic meadows; herb meadow, 610 m, 26 August 1987 (#659 [35]); tall forb meadow, 396 m, 4 September 1988 (#1288 [43]); *Scirpus caespitosus* mire, 335 m, 5 September 1988 (#1310B, 1310C [54]); /sT/(X)/-/ (Hpr). This record extends the known range from the eastern Kenai Peninsula about 160 km west and is the first report from the Alaska Peninsula (Hultén 1968).

*Chrysanthemum arcticum* L. Arctic Daisy. Uncommon in tidal marshes; disturbed sites in tidal marsh at cannery, 6 m, 8 July 1987 (#389 [46]); /aSs/(X)/EA/ (Hsr).

*Erigeron peregrinus* (Pursh) Greene subsp. *peregrinus*. Coastal Fleabane. Common in mires, alpine heath, and mesic meadows; *Scirpus caespitosus* slope mire, 122 m, 4 July 1987 (#87024-3 [55]); snowbed meadow, 610 m, 26 August 1987 (#625A, 625 [35]); *Empetrum nigrum* - *Cassiope stelleriana* heath, 652 m, 30 August 1988 (#88006-13 [26]); *Hieracium triste* low forb meadow, 792 m, 3 September 1988 (#88017-1 [14]); *Veratrum eschscholtzii* - *Calamagrostis canadensis* tall forb meadow, 396 m, 4 September 1988 (#88030-9 [44]); *Athyrium filix-femina* tall forb meadow, 482 m, 5 September 1988 (#88036-15 [42]); *Luetkea pectinata* - *Geranium erianthum* low forb meadow, 396 m, 5 September 1988 (#88038-1 [49]); *Scirpus caespitosus* sloping mire, 305 m, 6 September 1988 (#88047-13 [54]); /ST/W/eA/ (Hs).

*Hieracium triste* Willd. Woolly Hawkweed. Uncommon in alpine, low forb meadows; disturbed sites around cannery, 6 m, 8 July 1987 (#634 [73]); observed in *Erigeron peregrinus* - *Hieracium triste* low forb meadow, 792 m, 3 September 1988 [14]; /ST/W/eA/ (Hs). This record is an extension of some 160 km from the eastern Kenai Peninsula, lower Susitna River area, and Kodiak Island that helps to fill the gap with collections from the western Alaska Peninsula Hultén 1968).

*Matricaria matricarioides* (Less.) Porter. Pineapple Weed. Uncommon in anthropogenically disturbed sites; disturbed sites around cannery, 6 m, 8 July 1987 (#394 [73]); introduced weed.

*Petasites frigidus* (L.) Fries. var. *nivalis* (Greene) Cronq. Arctic Sweet Coltsfoot. Common in alpine, wet-mesic and mesic meadows and heaths; drainage channel in snowbed meadow, 610 m, 26 August 1987 (#649 [35]); late melt snowbed, 549 m, 5 September 1987 (#911 [38]); *Salix* swamp, 311 m, 5 September 1988 (#88046-9 [54]); *Empetrum nigrum* - *Cassiope stelleriana* heath, 677 m, 31 August 1988 (#88007-12 [19]); *Empetrum*

*nigrum* - *Vaccinium uliginosum* hummocky heath, 701 m, 14 September 1988 (#88066-15 [18]); streamside, 366 m, 6 September 1988 (#1325A [53], 1350 [57]); observed in *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 [14]; *Calamagrostis canadensis* - *Sanguisorba stipulata* meadow, 152 m, 9 September 1988 [23]; /aST/WW/EA/ (Grh).

*Prenanthes alata* (Hook.) D. Dietr. Rattlesnake Root. Uncommon in stream banks and coastal cliff ledges; mesic shady stream canyon, 12 m, 26 August 1987 (#501 [80]); observed in *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 427 m, 4 September 1988 [46]; /sT/W/-/ (Hp).

*Senecio pseudo-arnica* Less. Seabeach Groundsel. Common in coastal beaches; coastal sandy beach, 1 m, 5 July 1987 (#442 [64]); /ST/D(coastal)/eA/ (Hp).

*Senecio triangularis* Hook. Abundant in subalpine, forb meadows; lush herb meadow, 119 m, 4 July 1987 (#288 [71]); observed in *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 469 m, 4 September 1988 [46]; *Epilobium angustifolium* - *Calamagrostis canadensis* tall forb meadow, 436 m, 4 September 1988 [47]; *Veratrum eschscholtzii* - *Calamagrostis canadensis* tall forb meadow, 396 m, 4 September 1988 [47]; *Artemisia norvegica* - *Geranium erianthum* low forb meadow, 588 m, 14 September 1988 [39]; /ST/W/-/ (Hp).

*Solidago canadensis* L. var. *subserata* (DC.) Cronq. Canada Goldenrod. Uncommon in coastal forb meadows on the northern end of Chisik Island; *Epilobium angustifolium* meadow, 6 m, 8 September 1988 (#1379 [2]); /ST/X/-/ (Hpr).

*Solidago multiradiata* Ait. Northern Goldenrod. Uncommon in open rocky slopes and ridges; rock outcrop, 549 m, 26 August 1987 (#673 [34]); rock outcrop, 792 m, 30 August 1988 (#1202 [34]); /aST/X/eA/ (Hsr).

*Taraxacum ceratophorum* (Ledeb.) DC. Horned Dandelion. Rare in coastal forb meadow on the northern end of Chisik Island; along trail in *Lupinus nootkatensis* - *Epilobium angustifolium* beach meadow; 3 m, 11 June 1993 (#T3219-X-1 [2]); /AST/X/GEA/ (Hr).

*Taraxacum officinale* Weber ex Wiggers. Common Dandelion. Uncommon in anthropogenically disturbed sites and colluvial debris at cliff bases; *Ligusticum scoticum* - *Lathyrus japonicus* pebble beach, 1.5 m, 30 June 1987 (#87006-11 [46]); *Taraxacum officinale* low forb colluvial slope, 10 m, 30 June 1987 (#87009-1 [79]); introduced.

#### Cornaceae Dogwood Family

*Cornus suecica* L. (incl. *C. unalaschensis*). Swedish Cornel. Uncommon in low deciduous scrub at the southern end of Chisik Island; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#319 [81]); observed in *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 671 m, 14 September 1988 [18]; /aST/(X)/GEA/ (Hpr(Ch)).

#### Crassulaceae Stonecrop Family

*Sedum rosea* (L.) Scop. Roseroot. Common in coastal cliffs and alpine heaths; coastal cliff, 6 m, 30 June 1987 (#207 [76]); observed in *Vaccinium uliginosum* - *Cladina stellaris* heath, 747 m, 30 August 1988 [12]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 744 m, 3 September 1988 [15]; /aST/D/GEA/ (Ch).

#### Cruciferae (Brassicaceae) Mustard Family

*Arabis glabra* (L.) Bernh. (*Turritis glabra*). Tower Mustard. Uncommon in rocky cliffs in the vicinity of Snug Harbor; rock outcrop, 1.5 m, 8 July 1987 (#441 [64]); introduced. This is an extension of the known range about 480 km southwestward from the Cooper River drainage (Hultén 1968).

*Arabis lyrata* L. Lyre-leaf Rockcress. Common in lower elevation and alpine rock outcrops on exposed mineral soil; *Ligusticum scoticum* - *Lathyrus japonicus* pebble beach, 1.5 m, 30 June 1987 (#87006-7 [46]); disturbed sites around cannery, 6 m, 8 July 1987 (#396 [73]); mesic shady stream canyon, 12 m, 26 August 1987 (#505 [80]); stream gravel outwash along beach (#211 [27]); *Mimulus guttatus* escarpment crevice, 2 m, 7 July 1987 (#87032-8 [76]); rock cliff by sea, 3 m, 27 June 1987 (#14 [68]); rocky outcrop, 5 m, 2 September 1987 (#677 [84]); eroding cliff by streamside, 411 m, 6 September 1988 (#1324B [50]); streambed gravel, 24 m, 9 September 1988 (#1390E [22]); stream outwash on gravel, 1.5 m, 9 September 1988 (#1391 [27]); summit margin at top of cliff, 800 m, 17 June 1993 (#4022 [11]); on mineral soil in rock outcrop, 6 m, 20 June 1993 (#4036A [84]); *Lupinus nootkatensis* - *Epilobium angustifolium* beach meadow, 4 m, 11 June 1993 (#T3219-9 [2]); /ST/X/eA/ (Hs).

*Barbarea orthoceras* Ledeb. Wintercress. Uncommon in moist soil along streamlets and rock outcrops; *Mimulus guttatus* escarpment crevice, 1.5 m, 7 July 1987 (#87032-9 [76]); streambed gravel, 24 m, 9 September 1988 (#1390A [50]); /aST/X/GEA/ (Hs).

*Capsella bursa-pastoris* (L.) Medic. Shepherds Purse. Uncommon in disturbed sites around cannery; disturbed

sites around cannery, 6 m, 8 July 1987 (#386 [73]); introduced.

*Cardamine bellidifolia* L. Alpine Bitter Cress. Uncommon in alpine tundra and snowbeds; late melt snowbed, 549 m, 5 September 1987 (#919 [35]); /AST/X/GEA/ (Ch(Hr)).

*Cardamine oligosperma* Nutt. ex T. and G. (*C. umbellata*). Common in moist sites of alpine heaths, canyon rock outcrops, and black cottonwood forests; *Populus trichocarpa* forest on alluvial gravel, 64 m, 9 July 1987 (#87040-9 [6]); late melt snowbed, 549 m, 5 September 1987 (#915 [35]); *Salix planifolia* subsp. *pulchra* swamp, 311 m, 5 September 1988 (#88046-11 [54]); spring mire in canyon, 518 m, 6 September 1988 (#1322C [37]); moist soil over rock outcrop, 13 m, 20 June 1993 (#4031 [83]); *Calamagrostis canadensis* - *Heracleum lanatum* meadow, 53 m, 10 June 1993 (#T3211-13 [83]); observed in *Heracleum lanatum* - *Epilobium angustifolium* meadow, 152 m, 9 September 1988 [23]; /ST/W/eA/ (Grh).

*Draba borealis* DC. Northern Rockcress. Uncommon in rock outcrops and colluvial debris; *Heracleum lanatum* - *Urtica gracilis* colluvial debris slope, 12 m, 30 June 1987 (#87008-19 [79]); *Taraxacum officinale* - *Cerastium arvense* colluvial debris slope, 9 m, 30 June 1987 (#87009-29 [79]); coastal rock cliff, 3 m, 27 June 1987 (#15 [68]); coastal rock outcrop, 5 m, 2 September 1987 (#676 [84]); on mineral soil in rock outcrop, 7 m, 20 June 1993 (#4035 [84]); /aST/W/eA/ (Ch(Hs)). This record extended the range north into western lower Cook Inlet about 200 km from the nearest known collections on Kodiak Island and Kukak Bay (Hultén 1968).

*Draba crassifolia* Graham. Rare in rock outcrops; rock outcrop in cold ravine; 500 m, 13 June 1993 (#4016 [45]); /aST/X/GE/ (Ch(Hr)). This collection extends the known range about 400 km southwest from between Paxson and Summit (Hultén 1941-50, 1968).

*Draba glabella* Pursh. Rare on dry, alpine gravel; dry gravel, 549 m, 5 September 1987 (#925 [38]); /AST/X/GEA/ (Ch(Hs)).

*Draba stenoloba* Ledeb. Uncommon in alpine snowbeds and rock outcrops; late melt snowbed, 549 m, 5 September 1987 (#912 [38]); margin of snowbed, 549 m, 4 September 1988 (#1297 [34]); eroding cliff by streamside, 411 m, 6 September 1988 (#1324C [45]); on mineral soil in canyon, 570 m, 17 June 1993 (#4028A [41]); /ST/W/-/ (T(Hs)). Although this record is in the range proposed by Hultén (1968), it is apparently the first report from the upper Alaska Peninsula. The nearest known site is Seward about 180 km to the east (Hultén 1968).

*Erysimum inconspicuum* (Wats.) MacM. Uncommon in colluvial debris and mineral soil of exposed rock outcrops; *Taraxacum officinale* - *Cerastium arvense* colluvial debris, 9m, 30 June 1987 (#87009-11 [79]); *Urtica gracilis* escarpment debris, 1.5 m, 7 July 1987 (#87033-21 [79]); on mineral soil in rock outcrop, 7 m, 20 June 1993 (#4036B [84]); /ST/X/-/ (Hs). This record extends the known range southwest from the Anchorage area about 140 km into the upper Alaska Peninsula (Hultén 1968).

*Rorippa islandica* (Oed.) Borbas var. *hispidula* (Desv.) Butters and Abbe. Marsh Yellowcress. Rare in wet graminoid coastal marsh; *Carex lyngbyei* - *Rumex occidentalis* marsh, 3 m, 9 September 1988 (#1228 [27]); /aST/X/GEA/ (Hs(biennial or T)).

#### Diapensiaceae Diapensia Family

*Diapensia lapponica* L. Diapensia. Common in alpine heaths; *Cassiope stelleriana* - lichen tundra, 549 m, 5 September 1987 (#926 [38]); observed in *Vaccinium uliginosum* - *Cladina rangiferina* tundra, 823 m, 30 August 1988 [12]; *Arctostaphylos alpina* - *Cladina rangiferina* tundra, 802 m, 30 August 1988 [13]; /AST/X/GEA/ (Ch, evergreen).

#### Droseraceae Sundew Family

*Drosera rotundifolia* L. Round-leaf Sundew. Uncommon in mires; *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-8 [10]); observed in *Scirpus caespitosus* - *Sphagnum lindbergii* sloping mire, 37 m, 11 September 1988 [10]; /aST/X/GEA/ (Hr(Hel)).

#### Empetraceae Crowberry Family

*Empetrum nigrum* L. subsp. *nigrum* Crowberry. Abundant in alpine heaths and mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-6 [55]); observed in *Vaccinium uliginosum* - *Cladina stellaris* tundra, 823 m, 30 August 1988 [12]; *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 732 m, 30 August 1988 [25]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low scrub, 725 m, 3 September 1988 [19]; *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 [46]; subsp. *hermaphroditicum* (Lange) Böcher. Uncommon (?) in alpine heaths; *Empetrum nigrum* heath on ridge, 600 m, 17 June 1993 (#4025 [26]); /AST/X/GEA/ (Ch, evergreen). The Chisik Island record of *E. nigrum* subsp. *hermaphroditicum* is outside the potential range (Hultén 1968), which is shown as distinctly non-coastal. The nearest

known site is from Westerman (1982) in the Lake Iliamna region at the base of the Alaska Peninsula.

#### Ericaceae Heath Family

*Andromeda polifolia* L. Bog Rosemary. Uncommon in mires; mire area, 119 m, 4 July 1987 (#243 [55]); observed in *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; /aST/X/GEA/ (Ch(N) evergreen).

*Arctostaphylos alpina* (L.) Spreng. Alpine Bearberry. Common in wind-exposed, alpine tundra; *Cladina rangiferina* - *Arctostaphylos alpina* - *Vaccinium uliginosum* tundra, 610 m, 26 August 1987 (#613 [35]); observed in *Empetrum nigrum* - *Cladina stellaris* tundra, 823 m, 30 August 1988 [12]; /aST/X/GEA/ (Ch).

*Cassiope lycopodioides* (Pallas) D. Don. Club-moss Mountain Heath. Common in alpine tundra; snowbed meadow, 610 m, 26 August 1987 (#631 [35]); cliff margin at summit, 808 m, 30 August 1988 (#1205B [11]); /sT/W/eA/ (Ch, evergreen).

*Cassiope stelleriana* (Pallas) DC. Alaska Moss Heath, Starry Cassiope. Abundant in alpine heaths; snowbed meadow, 610 m, 26 August 1987 (#627 [35]); observed in *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988[26]; *Luetkea pectinata* scarcely vegetated late melt snowbed, 671 m, 1 September 1988 [25]; /sT/W/eA/ (Ch, evergreen).

*Ledum decumbens* (Ait.) Lodd. Northern Labrador Tea. Uncommon in mires and heaths; short sedge mire, 76 m, 6 July 1987 (#358 [77]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; observed in *Arctostaphylos alpina* - *Empetrum nigrum* heath, 671 m, 14 September 1988 [32]; /aST/X/GEA/ (Ch(N, evergreen)).

*Loiseleuria procumbens* (L.) Desv. Alpine Azalea. Common in alpine heaths; *Cladina rangiferina* - *Arctostaphylos alpina* - *Vaccinium uliginosum* tundra, 610 m, 26 August 1987 (#615 [35]); observed in *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 [26]; /aST/X/GEA/ (Ch, evergreen).

*Menziesia ferruginea* Smith. False Azalea. Abundant in low deciduous scrub on ridges below about 152 m in southern portions of Chisik Island; margin of *Alnus crispa* thicket, 91 m, 29 June 1987 (#173 [63]); observed in open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; /sT/W/-/ (N).

*Oxycoccus microcarpus* Turcz ex Rupr. Dwarf Cranberry. Common in mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-7 [55]); observed in *Carex limosa* - *Sphagnum girgensohnii* mire, 119 m, 4 July 1987 [55]; *Carex stylosa* - *Sphagnum warnstorffii* mire, 311 m, 5 September 1988

[54]; *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; *Carex pauciflora* - *Sphagnum russowii* mire, 37 m, 11 September 1988 [10]; /sT/X/EA/ (Ch, evergreen).

*Phyllodoce aleutica* (Spreng.) Heller. Aleutian Mountain Heather. Common in alpine heaths; snowbed meadow, 610 m, 26 August 1987 (#628 [35]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 677 m, 31 August 1988 (#88007-35 [25]); observed in *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 [46]; /sT/W/eA/ (Ch, evergreen).

*Vaccinium caespitosum* Michx. Dwarf Blueberry. Uncommon in alpine heaths; *Vaccinium* heath, 700 m, 17 June 1993 (#4029 [33]); /sT/X/-/ (Ch).

*Vaccinium ovalifolium* Smith ex Rees. Early Blueberry. Uncommon in Sitka spruce forests and low elevation heaths and low deciduous scrub; *Picea sitchensis* forest, 3 m, 3 July 1987 (#239 [7]); observed in low deciduous thickets on ridges; *Vaccinium ovalifolium* - *Spiraea beauverdiana* dwarf scrub meadow, 125 m, 29 June 1987 [66]; /sT/(X)/eA/ (N).

*Vaccinium uliginosum* L. Bog or Alpine Blueberry. Abundant in alpine heaths and common in mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-5 [55]); observed in *Vaccinium uliginosum* - *Cladina rangiferina* tundra, 823 m, 30 August 1988 [12]; *Empetrum nigrum* - *Cassiope stelleriana* heath, 677 m, 31 August 1988 [25]; *Empetrum nigrum* - *Vaccinium uliginosum* hummocky heath, 683 m, 14 September 1988 [32]; /AST/X/GEA/ (Ch(N)).

*Vaccinium vitis-idaea* L. Mountain Cranberry, Lingonberry. Common in alpine heaths; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#321 [81]); observed in *Vaccinium uliginosum* - *Cladina stellaris* tundra, 823 m, 30 August 1988; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low scrub, 701 m, 3 September 1988 [12]; *Arctostaphylos alpina* - *Cladina rangiferina* heath, 530 m, 5 September 1988 [19]; /aST/X/GEA/ (Ch, evergreen).

#### Gentianaceae Gentian Family

*Gentiana douglasiana* Bong. Swamp Gentian. Uncommon in mires; *Carex pauciflora* - *Sphagnum papillosum* mire, 76 m, 6 July 1987 (#87031-4 [77]); *Scirpus caespitosus* - *Sphagnum warnstorffii* sloping mire, 305 m, 6 September 1988 (#88047-4 [54]); *Scirpus caespitosus* mire, 335 m, 5 September 1988 (#1309 [54]); /sT/W/-/ (T).

*Gentiana glauca* Pallas. Glaucous Gentian. Common in alpine heaths; snowbed meadow, 610 m, 26 August 1987 (#639 [35]); observed in *Empetrum nigrum* -

*Cassiope stelleriana* hummocky heath, 707 m, 31 August 1988 [25]; /aST/W/eA/ (Grh).

#### Geraniaceae Geranium Family

*Geranium erianthum* DC. Northern Geranium. Abundant in alpine and subalpine meadows; lush herb meadow, 119 m, 4 July 1987 (#289 [71]); upper gravel beach, 3 m, 1 July 1987 (#171 [68]); observed in *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 457 m, 4 September 1988 [46]; *Senecio triangularis* - *Veratrum eschscholtzii* tall forb meadow, 451 m, 5 September 1988 [49]; *Calamagrostis canadensis* - *Sanguisorba stipulata* tall forb meadow, 335 m, 5 September 1988 [52]; /ST/W/eA/ (Hs).

#### Haloragaceae Watermilfoil Family

*Hippuris montana* Ledeb. ex Reichenb. Mountain Mare-tail. Abundant in wet streamlets, particularly observed in upper elevation drainage channels; snowbed forb meadow, 610 m, 26 August 1987 (#645 [35]); /ST/W/-/ (Hel(Grh)). Although this species is in the range proposed by Hultén (1968) on Chisik Island, it is unreported from the western Cook Inlet and from most of the Alaska Peninsula. The abundance of this species on Chisik Island is in contrast to Hultén (1968), who noted it as rare.

*Hippuris vulgaris* L. Common Mare-tail. Uncommon in marshes; *Hippuris vulgaris* marsh, 335 m, 5 September 1987 (#1308A [54]); /AST/X/GEA/ (Hel(Grh)).

#### Hydrophyllaceae Waterleaf Family

*Romanzoffia sitchensis* Bong. Mist-maid. Uncommon in moist sites on rock outcrops; base of escarpment, 6 m, 30 June 1987 (#203 [68]); rocky creek bed, 61 m, 10 June 1993 (#4000 [65]); /sT/W/-/ (Hr(Hs)).

#### Leguminosae Legume Family

*Lathyrus japonicus* Willd. (*L. maritimus*) Beach-pea. Common in coastal beaches; upper gravel beach, 3 m, 1 July 1987 (#170 [68]); observed in *Elymus arenarius* - *Ligusticum scoticum* pebble beach ridge, 1.5 m, 30 June 1987 [46]; *Honkenya peploides* pebble beach, 1 m, 3 July 1987 [1]; /aST/X/GEA/ (Grh(Gst, Hpr)).

*Lupinus nootkatensis* Donn ex Sims. Nootka Lupine. Abundant in alpine heaths and meadows and coastal meadows at the northern end of Chisik Island; *Lupinus nootkatensis* - *Poa eminens* beach ridge meadow, 2 m, 3 July 1987 (#42 [3]); observed in *Empetrum nigrum* - *Cladina stellaris* tundra, 808 m, 30 August 1988 [12]; *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 677 m, 31 August 1988 [25]; *Luetkea pectinata* scarcely vegetated late melt snowbed, 701 m, 1 September 1988 [25]; *Erigeron peregrinus* - *Hieracium*

*triste* low forb meadow, 792 m, 3 September 1988 [14]; *Cassiope stelleriana* hummocky heath, 800 m, 24 June 1993 (#4051A [25]); /sT/W/-/ (Hp).

*Oxytropis campestris* (L.) DC. var. *varians* (Rydb.) Barneby. Field Oxytrope. Uncommon in rock outcrops and only found on Duck Island; rock outcrop, 5 m, 2 September 1987 (#675, 709 [84]); /aST/(X)/EA/ (Hr).

*Oxytropis nigrescens* (Pallas) Fisch. ex DC. Blackish Oxytrope. Uncommon in wind-exposed, alpine heath; summit cliff, 823 m, 5 September 1987 (#1026 [11]); summit margin at top of cliff, 810 m, 13 June 1993 (#4010 [11]); /aSs/X/A/ (Hr(Ch)).

*Trifolium repens* L. White Clover. Common in anthropogenically cultivated sites at cannery; cannery lawn, 6 m, 8 July 1987 (#400B [73]); introduced.

#### Menyanthaceae Buckbean Family

*Menyanthes trifoliata* L. Buckbean. Uncommon in mires; *Menyanthes trifoliata* - *Carex limosa* bog pool, 119 m, 4 July 1987 (#87022-1 [55]); /aST/X/GEA/ (Grh(Hel)).

#### Onagraceae Evening Primrose Family

*Circaea alpina* L. Small Enchanters Nightshade. Common in Sitka spruce forests and moist sites in canyons; mesic shady stream canyon, 12 m, 26 August 1987 (#503 [80]); open *Picea sitchensis* forest, 6 m, 3 July 1987 (#87020-29 [7]); /ST/X/EA/ (Grh).

*Epilobium alpinum* L. (*E. anagallidifolium* Lam. in part). Alpine Willow-herb. Common in moist sites near seeps and springs; silty streamlet bank, 119 m, 4 July 1987 (#278 [55]); disturbed sites at cannery, 6 m, 8 July 1987 (#391, 387 [73]); rock outcrop at edge of snowbed meadow, 610 m, 26 August 1987 (#643 [35]); pond margin, 335 m, 5 September 1988 (#1316 [54]); eroding cliff by streamside, 411 m, 6 September 1988 (#1324A [45]); *Erigeron peregrinus* - *Hieracium triste* low forb meadow, 792 m, 3 September 1988 (#88017-9 [14]); edge of late melt snowbed, 683 m, 1 September 1988 (#1219 [25]); streamside cliff, 518 m, 4 September 1988 (#1279A [41]); *Hippuris montana* streamlet bed, 543 m, 5 September 1988 (#1295R2 [40]); spring mire in canyon, 518 m, 6 September 1988 (#1322B [37]); /aST/D/GEA/ (Hpr).

*Epilobium angustifolium* L. Fireweed. Abundant in subalpine meadows and coastal meadows; disturbance site at cannery, 6 m, 2 September 1988 (#1233 [73]); observed in *Heracleum lanatum* - *Urtica gracilis* colluvial debris slope, 12 m, 30 June 1987 [79]; *Populus trichocarpa* forest, 3 m, 1 July 1987 [28]; *Elymus arenarius* beach ridge, 1.5 m, 3 July 1987 [3]; *Lupinus nootkatensis* - *Epilobium angustifolium* beach ridge meadow, 2 m, 3 July 1987 [3]; *Epilobium angustifolium* -

*Athyrium filix-femina* tall forb meadow, 427 m, 4 September 1988 [46]; /aST/X/GEA/ (Hp(Gr)).

*Epilobium ciliatum* Raf. (*E. adenocaulon*). Northern Willow-herb. Uncommon in moist soil, along streams; mesic shady stream canyon, 12 m, 26 August 1987 (#500 [80]); *Salix planifolia* subsp. *pulchra* - *Potentilla palustris* swamp, 311 m, 5 September 1988 (#88046-3 [54]); /sT/X/E/ (Hpr). This record extends the known range southwestward about 180 km from Anchorage into the upper Alaska Peninsula (Hultén 1968).

*Epilobium glandulosum* Lehm. Glandular Willow-herb. Uncommon in moist seepage sites and wet meadows; seepage in cliff crevice, 1.5 m, 8 July 1987 (#406 [68]); *Carex lyngbyei* wet meadow, 3 m, 1 September 1988 (#1229 [27]); *Hippuris montana* streamlet bank, 543 m, 5 September 1988 (#12950 [40]); /sT/X/eA/ (Hpr).

*Epilobium latifolium* L. Dwarf Fireweed. Abundant in rock outcrops, stream banks, and talus; coastal stream gravel outwash, 3 m, 1 July 1987 (#213 [27]); observed on snowbed streamlet on gravel, 561 m, 14 September 1988 [34]; colluvial slope, 3 m, 12 September 1988 [60]; *Mimulus guttatus* cliffs, 8 m, 1988 [76]; /AST/X/GEA/ (Hp(Ch)).

*Epilobium leptocarpum* Hausskn. Slender-fruited Willow-herb. Common in moist sites; disturbance at cannery, 6 m, 2 September 1988 (#1234 [73]); streamside, 24 m, 9 September 1988 (#1390G [22]); lower colluvial slope, 12 m, 12 September 1988 (#1411A [60]); /sT/X/-/ (Hpr).

*Epilobium luteum* Pursh. Yellow Willow-herb. Uncommon in moist sites along streamlets and springs; coastal seep, 15 m, 21 June 1993 (#4047 [48]); /sT/W/-/ (Hp).

#### Orobanchaceae Broomrape Family

*Boschniakia rossica* (Cham. and Schlecht.) Fedtsch. Northern Groundcone. Common in alder thickets; *Calamagrostis canadensis* - *Athyrium filix-femina* meadow, 61 m, 9 July 1987 (#87038-5 [5]); observed in *Alnus crispa* thickets; /Ss/W/A/ (Gp).

#### Plantaginaceae Plantain Family

*Plantago macrocarpa* Cham. and Schlecht. Seashore Plantain. Uncommon in moist alpine sites and mires; snowbed meadow, 701 m, 1 September 1988 (#1221 [25]); observed in *Plantago macrocarpa* - *Sphagnum girgensohnii* mire; 518 m, 4 September 1988 [25]; /sT/W/eA/ (Hr). These collections extend the known range about 240 km from the Prince William Sound and help to fill in the gap with records from the Aleutians and Kodiak Island (Hultén 1968).

*Plantago maritima* L. Goose-tongue. Rare in tidal flats; tidal salt marsh on silt, sea level, 27 June 1987 (#10 [27]); /aST/X/GEA/ (Hr).

#### Polemoniaceae Phlox Family

*Polemonium pulcherrimum* Hook. Pretty Jacobs Ladder. Common in gravelly soil associated with rock outcrops; rock outcrop, 549 m, 26 August 1987 (#674 [34]); on gravel slope, 701 m, 5 September 1987 (#966 [24]); coastal cliff ledge, 6 m, 30 June 1987 (#206 [64]); rock outcrop, 5 m, 2 September 1987 (#678 [84]); *Taraxacum officinale* - *Cerastium arvense* low forb colluvial debris slope, 9 m, 30 September 1987 (#87009-14 [79]); streamside, 24 m, 9 September 1988 (#1390F [22]); /ST/W/-/ (Hp(Ch)).

#### Polygonaceae Buckwheat Family

*Oxyria digynia* (L.) Hill. Mountain Sorrel. Uncommon in moist alpine gravelly and rocky sites; *Salix glauca* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1987 (#964 [24]); observed in scarcely vegetated creekbed, 518 m, 4 September 1988; /AST/X/GEA/ (Hr).

*Polygonum viviparum* L. Alpine Bistort. Common in alpine heaths and meadows; snowbed meadow, 610 m, 26 August 1987 (#624 [35]); streamside meadow, 549 m, 4 September 1988 (#1277 [33]); observed in *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 [26]; /AST/X/GEA/ (Gst).

*Rumex occidentalis* Wats. Western Dock. Uncommon in moist sites, coastal marshes, and anthropogenically disturbed sites around the cannery; moist cliff on mineral soil, 12 m, 27 August 1987 (#580 [60]); *Carex lyngbyei* marsh, 2 m, 9 September 1988 (#88056-2 [27]); disturbed mineral soil at cannery, 3 m, 10 September 1988 (#1397 [73]); /ST/X/-/ (Hs).

#### Portulacaceae Purslane Family

*Montia fontana* L. Blinks, Water Chickweed. Rare in stream bank sites; silty streamlet bank, 119 m, 4 July 1987 (#279 6); /aST/X/GEA/ (T(Hel, HH)).

#### Primulaceae Primrose Family

*Primula cuneifolia* Ledeb. var. *saxifragifolia* (Lehm.) Pax ex Egler. Wedge-leaf Primrose. Uncommon in alpine heaths; snowbed meadow, 610 m, 26 August 1987 (#634A [35]); *Cassiope stelleriana* - lichen tundra, 549 m, 5 September 1987 (#928 [26]); /Ss/W/eA/ (Hr).

*Trientalis europaea* L. Arctic Starflower. Common in moist alder thickets and mires; *Alnus crispa* thicket, 122 m, 27 June 1987 (#17 [68]); observed in open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; open *Alnus crispa*

- *Calamagrostis canadensis* scrub, 189 m, 29 June 1987 [62]; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 [55]; *Carex pauciflora* - *Sphagnum papillosum* mire, 76 m, 6 July 1987 [77]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low scrub, 725 m, 3 September 1988 [18]; /ST/W/eA/ (Hpr).

#### Pyrolaceae Wintergreen Family

*Moneses uniflora* (L.) Gray. Single Delight. Rare in Sitka spruce forest at northern end of Chisik Island; observed in open *Picea sitchensis* forest, 6 m, 11 June 1993 [7]; /ST/X/EA/ (Hr (evergreen)).

*Pyrola asarifolia* Michx. Liverleaf or Pink-flowered Wintergreen. Uncommon in black cottonwood forests; *Populus trichocarpa* forest, 3 m, 1 July 1987 (#214 [28]); *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 (#87016-16 [28]); *Populus trichocarpa* - *Alnus crispa* forest, 9 m, 8 September 1988 (#88052-15 [9]); /ST/X/A/ (Hrr, evergreen).

*Pyrola minor* L. Lesser Wintergreen. Uncommon in moist alpine sites; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low scrub, 744 m, 3 September 1988 (#88018-12 [18]); *Artemisia norvegica* - *Empetrum nigrum* meadow, 792 m, 30 August 1988 (#1204B [39]); /aST/X/GEA/ (Hrr, evergreen).

*Pyrola secunda* L. (*Orthilia secunda*). One-sided Wintergreen. Common in black cottonwood and Sitka spruce forests; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 (#87016-8 [28]); *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* dwarf thicket, 744 m, 3 September 1987 (#88018-7 [18]); observed in open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; *Populus trichocarpa* - *Gymnocarpium dryopteris* forest, 10 m, 8 September 1988 [6]; /aST/X/GEA/ (Hrr(Ch, evergreen)).

#### Ranunculaceae Buttercup Family

*Aconitum delphinifolium* DC. Larkspur-leaf Monkshood. Common in subalpine meadows; *Menziesia ferruginea* low scrub, 61 m, 6 July 1987 (#323 [81]); *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 (#88023-8 [46]); *Calamagrostis canadensis* - *Sanguisorba stipulata* graminoid meadow, 305 m, 6 September 1988 (#88049-8 [57]); observed in *Epilobium angustifolium* - *Calamagrostis canadensis* tall forb meadow, 457 m, 4 September 1988 [42]; *Veratrum eschscholtzii* - *Geranium erianthum* tall forb meadow, 396 m, 4 September 1988 [49]; *Senecio triangularis* - *Veratrum eschscholtzii* tall forb meadow, 451 m, 5 September 1988 [49]; *Artemisia norvegica* - *Arnica latifolia* low forb

meadow, 588 m, 14 September 1988 [39]; /aST/W/eA/ (Grt).

*Actaea rubra* (Ait.) Willd. Red and White Baneberry. Uncommon in black cottonwood forests and bluejoint meadows; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 (#87016-5 [28]); observed in *Calamagrostis canadensis* - *Athyrium filix-femina* meadow, 61 m, 9 July 1987 [5]; /ST/X/-/ (Grh).

*Aquilegia formosa* DC. Western Columbine. Rare in cannery garden; cultivated in cannery garden, 6 m, 2 September 1988 (#1232 [73]); introduced.

*Caltha leptosepala* DC. White-flowered Marsh-marigold. Common in alpine wet meadows above about 450 m elevation; drainage channel in snowbed meadow, 610 m, 26 August 1987 (#650 [35]); observed in creekbed, 506 m, 4 September 1988 [45]; *Plantago macrocarpa* - *Salix arctica* mire, 530 m, 4 September 1988 [33]; /sT/W/-/ (Hr). According to Hultén (1968) this species is on the margin of its known western range at Chisik Island, and this record seems to be the only collection between the lower Susitna River and Port Heiden on the central Alaska Peninsula.

*Caltha palustris* L. Yellow Marsh-marigold. Rare in coastal alder swamps; *Alnus crispa* swamp along stream, 5 m, 21 June 1993 (#4045 [28]); /aST/X/EA/ (Hs(Hel)).

*Coptis trifolia* (L.) Salisb. Trifoliate Goldthread. Uncommon in mires and open deciduous scrub; *Spiraea beauregardiana* dwarf scrub, 122 m, 27 June 1987 (#23 [66]); /aST/X/GA/ (Hrr(Ch)). This disjunct record helps to fill the gap between the Prince William Sound and the western tip of the Alaska Peninsula (Hultén 1968).

*Delphinium glaucum* Wats. Tall or Glauous Larkspur. Uncommon in coastal meadows on the north end of Chisik Island; cultivated in cannery garden, 6 m, 2 September 1988 (#1230 [73]); observed in *Lupinus nootkatensis* - *Epilobium angustifolium* beach ridge meadow, 2 m, 3 July 1987 [3]; /aST/W/-/ (Hs).

*Ranunculus eschscholtzii* Schlecht. Eschscholtz Buttercup. Common in alpine snowbeds and heaths; late melt snowbed, 549 m, 5 September 1987 (#910 [38]); *Salix glauca* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1987 (#960 [24]); *Luetkea pectinata* scarcely vegetated late melt snowbed, 689 m, 1 September 1988 (#88013-X-2 [25]); *Erigeron peregrinus* - *Hieracium triste* low forb meadow, 792 m, 3 September 1988 (#88017-12 [14]); *Vaccinium uliginosum* heath, 512 m, 4 September 1988 (#1298B [38]); streamside, 424 m, 6 September 1988 (#1323 [50]); *Cassiope stelleriana* hummocky heath, 810 m, 13 June 1993 (#4011 [14];

- Calamagrostis canadensis* slope in canyon, 530 m, 17 June 1993 (#4027 [46]); /ST/W/eA/ (Hr(Hs)).
- Ranunculus pygmaeus* Wahl. Pygmy Buttercup. Rare in alpine snowbeds; *Luetkea pectinata* scarcely vegetated late melt snowbed, 689 m, 1 September 1988 (#88013-X-1 [25]); /AST/X/GEA/ (Hs).
- Ranunculus uncinatus* D. Don. Uncommon in moist soil along streams; on gravel in canyon, 560 m, 23 June 1993 (#4052 [44]); /sT/W/-/ (Hs).
- Rosaceae Rose Family
- Amelanchier alnifolia* (Nutt.) Nutt. Alder-leaved or Northern Serviceberry. Uncommon in low deciduous scrub on the southern part of Chisik Island; margin of *Alnus crispa* thicket, 91 m, 29 June 1987 (#172 [63]); /ST/(X)/-/ (N). This record extends the known range southwestwards about 180 km from the upper Cook Inlet area (Hultén 1968).
- Aruncus sylvestris* Kostel. Goatsbeard. Uncommon on colluvial slopes at cliff bases and in black cottonwood forests; base of escarpment, 3 m, 1 July 1987 (#166 [68]); observed in *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 [28]; /sT/W/EA/ (Hp).
- Dryas octopetala* L. Mountain Avens. Uncommon in wind-exposed alpine heaths; *Cladina rangiferina* heath, 792 m, 30 August 1988 (#1203 [11]); /AST/W/GEA/ (Ch).
- Fragaria chiloensis* (L.) Duchesne. Beach Strawberry. Rare in coastal gravel outwash; on gravel outwash, 3 m, 1 July 1987 (#215 [21]); /sT/W/-/ (Hrr). This record extends the known range about 200 km from the Seward area and helps to fill the gap with records reported by Hultén (1968) from the western Alaska Peninsula.
- Geum aleppicum* Jacq. Rare in coastal beach ridge meadows on the northern end of Chisik Island; *Lupinus nootkatensis* - *Achillea millefolium* beach ridge meadow, 2 m, 11 June 1993 (#T3222-X-1 [2]); /ST/X/EA/ (Hs). This is the second report from the western Cook Inlet. The nearest known sites is along the shores of Lake Clark (Racine and Young 1978) and near the city of Kenai (Hultén 1968).
- Geum calthifolium* Menzies ex Rees. Caltha-leaf Avens. Uncommon in mires and wet meadows; wet meadow, 49 m, 6 July 1987 (#324 [78]); observed in *Carex pauciflora* - *Sphagnum papillosum* mire, 76 m, 6 July 1987 [77]; only observed in the southern portion of Chisik Island; /sT/W/eA/ (Hs). This record extends the known range and helps to fill a gap between the Prince William Sound and Kodiak Island and Kukak Bay on the Alaska Peninsula (Hultén 1968).
- Geum macrophyllum* Willd. Large-leaf Avens. Common in low elevation moist sites; moist *Alnus crispa* thicket, 61 m, 27 June 1987 (#26 [73]); *Heracleum lanatum* - *Urtica gracilis* tall forb colluvial debris slope; 12 m, 30 June 1987 (#87008-18 [79]); /ST/X/eA/ (Hs).
- Luetkea pectinata* (Pursh) Kuntze. Luetkea, Partridge-foot, Meadow-spiraea. Abundant in alpine snowbeds; snowbed meadow, 610 m, 26 August 1987 (#623 [35]); observed in *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 707 m, 31 August 1988 [26]; *Luetkea pectinata* scarcely vegetated late melt snowbed, 671 m, 1 September 1988 [25]; *Erigeron peregrinus* - *Hieracium triste* low forb meadow; 792 m, 3 September 1988 [14]; /ST/W/-/ (Ch).
- Potentilla anserina* L. Silverweed. Uncommon in tidal marshes; tidal marsh on silt, sea level, 27 June 1987 (#11 [46]); /aST/X/GEA/ (Hsr(Hrr, Ch)).
- Potentilla norvegica* L. Rough Cinquefoil. Uncommon in anthropogenically disturbed sites; disturbed sites around cannery on mineral soil, 6 m, 8 July 1987 (#400, 67 [73]); snowbed meadow, 610 m, 26 August 1987 (#633 [35]); /aST/X/GEA/ (Hs(biennial or T)).
- Potentilla palustris* (L.) Scop. Marsh Cinquefoil. Common in mires and swamps; *Carex limosa* - *Sphagnum girgensohnii* mire, 119 m, 4 July 1987 (#87023-3 [55]); observed in *Salix barclayi* - *Carex saxatilis* swamp, 119 m, 4 July 1987 [55]; *Eriophorum polystachion* - *Carex saxatilis* mire, 311 m, 5 September 1988 [54]; *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; *Salix* - *Potentilla palustris* swamp, 311 m, 5 September 1988 [54]; /aST/X/GEA/ (Grh(Hel, Ch)).
- Potentilla pensylvanica* L. Pennsylvania Cinquefoil. Uncommon in subalpine meadows; low forb meadow, 469 m, 4 September 1988 (#1282 [46]); observed in *Verastrum eschscholtzii* - *Calamagrostis canadensis* forb meadow, 396 m, 4 September 1988 [51]; /ST/X/A/ (Hs(Ch)). This is an extension of the known range southwestwards about 190 km from the upper Cook Inlet area into the base of the Alaska Peninsula (Hultén 1968).
- Potentilla villosa* Pallas ex Pursh. Villous Cinquefoil. Common in rocky outcrops; rock cliff, 6 m, 6 July 1987 (#318 [83]); cliff crevice, 12 m, 27 August 1987 (#608 [60]); eroding cliff near summit, 792 m, 30 August 1988 (#1209 [11]); /ST/W/eA/ (Ch(Hs)).
- Rosa acicularis* Lindl. Prickly Rose. Uncommon in Sitka spruce forests in northernmost part of Chisik Island; *Picea sitchensis* forest, 3 m, 3 July 1987 (#237 [7]); observed in open *Picea sitchensis* forest, 12 m, 3 July 1987 [7]; /ST/X/EA/ (N).

*Rosa rugosa* Thunb. Sitka Rose. Rare in gardens; cultivated in cannery garden, 6 m, 8 July 1987 (#403 [73]); introduced.

*Rubus chamaemorus* L. Cloudberry. Uncommon in moist, alpine heath and north-facing Sitka spruce forests; *Picea sitchensis* slope forest, 30 m, 9 July 1987 (#451 [7]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* heath, 518 m, 5 September 1988 [36]; /aST/X/GEA/ (Hp).

*Rubus pedatus* J. E. Smith. Five-leaf Bramble. Uncommon in Sitka spruce forests; open *Picea sitchensis* forest, 12 m, 3 July 1987 (#87020-28 [7]); /sT/W/eA/ (Hpr).

*Rubus spectabilis* Pursh. Salmonberry. Abundant in salmonberry and open alder thickets; *Rubus spectabilis* thicket, 61 m, 27 June 1987 (#24 [68]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 122 m, 29 June 1987 [63]; open *Alnus crispa* - *Calamagrostis canadensis* scrub, 189 m, 29 June 1987 [62]; *Calamagrostis canadensis* - *Rubus spectabilis* meadow, 29 m, 6 July 1987 [62]; *Rubus spectabilis* thicket, 335 m, 5 September 1988 [56]; /sT/W/eA/ (N).

*Rubus stellatus* J. E. Smith. Nagoon Berry. Common in mires and alpine low willow thickets, uncommon in bluejoint meadows; stream alluvium, 3 m, 1 July 1987 (#224 [28]); *Eriophorum polystachion* mire, 634 m, 3 September 1988 (#1270B [33]); observed in *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 [55]; *Salix barclayi* - *Carex saxatilis* swamp, 119 m, 4 July 1987 [55]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low scrub, 744 m, 3 September 1988 [18]; *Calamagrostis canadensis* - *Sphagnum fimbriatum* mire, 37 m, 11 September 1988 [10]; *Scirpus caespitosus* - *Sphagnum russowii* mire, 37 m, 11 September 1988 [10]; /ST/W/eA/ (Hpr).

*Sanguisorba stipulata* Raf. (*S. canadensis* subsp. *latifolia*) Sitka Burnet. Abundant in moist subalpine meadows; drainage channel in snowbed meadow, 610 m, 26 August 1987 (#653 [35]); observed in *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 [55]; *Erigeron peregrinus* - *Hieracium triste* low forb meadow, 792 m, 3 September 1988 [14]; *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 469 m, 4 September 1988 [46]; *Veratrum eschscholtzii* - *Geranium erianthum* tall forb meadow, 396 m, 4 September 1988 [51]; *Sanguisorba stipulata* - *Calamagrostis canadensis* tall forb meadow, 335 m, 5 September 1988 [53]; /aST/W/eA/ (Hs).

*Sibbaldia procumbens* L. Sibbaldia. Common in alpine, moist short-forb meadows; forb meadow, 610 m, 26 August 1987 (#657 [35]); observed in *Luetkea pectinata* scarcely vegetated late melt snowbed, 689 m, 1 September 1987 [25]; *Erigeron peregrinus* - *Hieracium*

*triste* low forb meadow, 792 m, 3 September 1988 [14]; *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 [46]; /aST/X/GEA/ (Ch).

*Sorbus scopulina* Greene. Western Mountain-ash. Common in alder thickets and Sitka spruce forests; *Alnus crispa* thicket, 122 m, 27 June 1987 (#18 [66]); observed in open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; *Alnus crispa* - *Dryopteris austriaca* thicket, 61 m, 12 September 1988 [59]; /ST/WW/-/ (N).

*Spiraea beauverdiana* Schneid. (*S. stevenii*). Beauverd Spiraea. Common in low deciduous thickets on the southern end of Chisik Island; *Alnus crispa* thicket, 27 August 1987 (#19 [63]); observed in *Alnus crispa* - *Spiraea beauverdiana* thicket, 475 m, 4 September 1988 [46]; *Vaccinium ovalifolium* - *Spiraea beauverdiana* dwarf scrub, 122 m, 29 June 1987 [66]; *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* thicket, 701 m, 3 September 1988 [18]; *Vaccinium uliginosum* - *Empetrum nigrum* heath, 671 m, 14 September 1988 [24]; *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 [46]; /aST/W/eA/ (N).

#### Rubiaceae Madder Family

*Galium boreale* L. Northern Bedstraw. Rare in gravelly meadows; *Heracleum lanatum* - *Epilobium angustifolium* alluvial meadow, 152 m, 9 September 1988 (#88055-5 [23]); /aST/X/GEA/ (Hpr).

*Galium trifidum* L. Small Bedstraw. Uncommon in marshes and coastal beaches; *Carex lyngbyei* marsh, 2 m, 9 September 1988 (#88056-3 [27]); *Elymus arenarius* gravelly shore, 3 m, 8 September 1988 (#1365 [27]); *Carex lyngbyaei* marsh, 5 m, 21 June 1993 (#4043 [27]); /aST/X/GEA/ (Hpr).

*Galium triflorum* Michx. Sweet-scented Bedstraw. Common in black cottonwood and Sitka spruce forests and uncommon in low elevation moist meadows; on gravel outwash under *Populus trichocarpa*, 3 m, 1 July 1987 (#216 [28]); *Epilobium angustifolium* shore meadow, 1 m, 5 July 1987 (#293 [64]); *Heracleum lanatum* - *Epilobium angustifolium* alluvial meadow, 127 m, 9 September 1988 (#88055-4 [23]); observed in *Populus trichocarpa* forest, 10 m, 8 September 1988 [9]; open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; /aST/X/GEA/ (Hp).

#### Salicaceae Willow Family

*Populus trichocarpa* T. and G. (*P. balsamifera* subsp. *trichocarpa*). Black Cottonwood. Common in alluvial outwash; *Populus trichocarpa* forest, 3 m, 1 July 1987 (#87014-1 [28]); observed in *Populus*

- trichocarpa* forest, 10 m, 8 September 1988 [9]; /sT/W/-/ (Ms). This record extends the known range from the western Kenai Peninsula and Kodiak Island into the base of the Alaska Peninsula (Hultén 1968).
- Salix alaxensis* (Anderss.) Coville. Feltleaf Willow. Common in low elevation sites along stream banks; stream alluvium, 3 m, 1 July 1987 (#220 [28]); observed along coastal bluffs; /aST/WW/eA/ (Mc).
- Salix arctica* Pallas. Arctic Willow. Common in alpine heath and mires; *Cladina rangiferina* - *Arctostaphylos alpina* prostrate shrub tundra, 610 m, 26 August 1987 (#617, 618 [35]); herb meadow, 610 m, 26 August 1987 (#658 [35]; *Cassiope stelleriana* - *Luetkea pectinata* tundra, 732 m, 5 September 1988 (#967 [26]); *Vaccinium uliginosum* - *Cladina mitis* heath, 823 m, 30 August 1988 (#88001-3 [12]); *Plantago macrocarpa* - *Sphagnum girgensohnii* mire, 518 m, 4 September 1988 (#88032-5 [25]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 710 m, 14 September 1988 (#88066-17 [24]); streamside cliff, 518 m, 4 September 1988 (#1279 [41]); low forb meadow, 366 m, 14 September 1988 (#1422 [49]); *Salix arctica* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1987 (#951 [24]) /AST/X/GEA/ (Ch).
- Salix barclayi* Anderss. Barclay Willow. Common in mires, swamps, and wet streambanks; *Carex pauciflora* - *Sphagnum papillosum* low sedge mire, 76 m, 6 July 1987 (#362 [77]); *Salix barclayi* - *Carex saxatilis* swamp, 119 m, 4 July 1987 (#87025-1 [55]); streamside, 640 m, 4 September 1988 (#1276 [33]); margin of *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#1406 [10]); creekside canyon, 30 m, 13 June 1993 (#4018 [74]); /ST/W/-/ (N)(Mc).
- Salix fuscescens* Anderss. Brownish or Alaska Bog Willow. Uncommon in mires; *Carex pauciflora* - *Sphagnum papillosum* low sedge mire, 76 m, 6 July 1987 (#361 [77]); *Eriophorum polystachion* - *Carex saxatilis* marsh, 311 m, 5 September 1988 (#88044-3 [54], det. G. Argus); /aSs/WW/eA/ (Ch).
- Salix phlebophylla* Anderss. Skeletonleaf Willow. Uncommon in alpine heaths; snowbed margin, 561 m, 6 September 1988 (#1320 [40]); *Vaccinium uliginosum* - *Cladina rangiferina* dwarf shrub heath, 823 m, 30 August 1988 (#88001-10 [12]); /aSs/W/eA/ (Ch).
- Salix planifolia* Pursh subsp. *pulchra* (Cham.) Argus. Diamondleaf Willow. Abundant as low deciduous thickets in low alpine sites; *Salix planifolia* subsp. *pulchra* thicket, 610 m, 26 August 1987 (#622 [35], det. G. Argus); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 (#88006-12 [26], det. G. Argus); *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* dwarf thicket, 744 m, 3 September 1988 (#88018-1 [18], det. G. Argus); *Salix planifolia* subsp. *pulchra* - *Potentilla palustris* swamp, 311 m, 5 September 1988, #88046-1 [54], det. G. Argus); *Salix planifolia* subsp. *pulchra* low thicket, 14 September 1988, 671 m, (#88071-1 [24], det. G. Argus); /aSs/W/EA/ (N).
- Salix polaris* Wahlenb. Polar Willow. Uncommon in alpine heaths; *Empetrum nigrum* - *Cladina stellaris* heath, 808 m, 30 August 1988 (#88002-8 [12], det. G. Argus); /aST/W/EA/ (Ch). This collection extends the known range in Alaska about 300 km south into the lower Cook Inlet region (Hultén 1968; Argus 1973).
- Salix reticulata* L. subsp. *reticulata* Netleaf. Willow. Uncommon in alpine heaths; *Vaccinium uliginosum* dwarf shrub tundra, 823 m, 5 September 1987 (#1027 [11]); observed in *Vaccinium uliginosum* - *Cladina stellaris* heath, 747 m, 30 August 1988 [13]; /aST/X/EA/ (Ch).
- Salix rotundifolia* Trautv. subsp. *rotundifolia*. Least Willow. Common in alpine heaths, rare in mires; *Carex pauciflora* low sedge mire, 76 m, 6 July 1987 (#360 [77]); *Empetrum nigrum* - *Cladina stellaris* heath, 808 m, 30 August 1988 (#88002-8, 88002-20A [12]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 (#88006-32 [26]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 655 m, 13 September 1988 (#88065-7 [26]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 (#88066-18 [19]); /aSs/W/nA/ (Ch).
- Salix sitchensis* Sanson in Bong. Sitka Willow. Common in thickets and gravel sites at cannery; disturbed gravel sites around cannery, 6 m, 8 July 1987 (#16, 393, 384, 285A, 286 [73]); shoreline *Alnus crispa* scrub on stream alluvium, 3 m, 1 July 1987 (#219 [28]); disturbed soil at cannery, 6 m, 2 September 1988 (#1235 [73]); streamside, 314 m, 6 September 1988 (#1345 [53]); tall forb meadow, 366 m, 13 September 1988 (#1421A [38]); /sT/W/eA/ (Mc).
- Salix stolonifera* Cov. Stoloniferous or Ovalleaf Willow. Uncommon in alpine heath; cliff base along stream, 640 m, 4 September 1988 (#1275 [35]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 677 m, 31 August 1988 (#88010-6, 88010-7 [70, det. G. Argus]; *Salix arctica* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1987 (#951A [24], det. G. Argus); /aSs/W/-/ (Ch).
- Saxifragaceae Saxifrage Family
- Chrysosplenium tetrandrum* (Lund.) Fries. Northern Water Carpet. Uncommon in moist sites along streams;

streamlet bed, 91 m, 29 June 1987 (#178 [63]); /AST/X/GEA/ (Hsr).

*Heuchera glabra* Willd. ex R. and S. Alpine Heuchera. Common in moist rock outcrops; coastal rock outcrop, 1.5 m, 8 July 1987 (#405 [68]); rock outcrop, 61 m, 27 June 1987 (#20 [65]); rocky outcrop along margin of late melt snowbed, 549 m, 5 September 1987 (#922 [35]); observed along rock cliffs in streamlet canyons, 396 m, 4 September 1988 [37]; /sT/W/-/ (Hr).

*Ribes laxiflorum* Pursh. Trailing Black Currant. Abundant in coastal thickets often forming an ecotone at shoreline between alder thickets and rock outcrops or gravel beaches, uncommon in interior alder thickets and Sitka spruce forests; *Alnus crispa* - *Dryopteris austriaca* thicket, 58 m, 9 July 1987 (#87037-3 [4]); coastal cliff base, 1.5 m, 27 June 1987 (#9 [68]); moist *Alnus crispa* thicket, 61 m, 27 June 1987 (#27 [64]); *Picea sitchensis* slope forest, 30 m, 9 July 1987 (#465 [7]); mesic shady stream canyon, 12 m, 26 August 1987 (#555 [80]); open *Picea sitchensis* forest, 6 m, 3 July 1987 (#87020-9 [7]); *Alnus crispa* - *Rubus spectabilis* - *Dryopteris austriaca* deciduous thicket, 88 m, 23 June 1993 (#4054 [67], T3229-6, -6A [67]); observed along coastal shoreline along the margin of *Alnus crispa* thickets, 2 m, 27 August 1987 [14, 69, 75]; /sT/W/eA/ (N). This record slightly extends the known range southwestward into the upper Alaska Peninsula area from the lower Susitna drainage and Kenai Peninsula (Hultén 1968).

*Ribes triste* Pallas. American Red Currant. Uncommon in Sitka spruce forests; open *Picea sitchensis* forest, 6 m, 3 July 1987 (#87020-7 [7]); /ST/X/eA/ (N).

*Saxifraga bronchialis* L. Prickly or Spotted Saxifrage. Common in rock outcrops; dry cliff, 6 m, 30 June 1987 (#205 [64]); /aST/W/EA/ (Ch).

*Saxifraga caespitosa* L. Tufted Saxifrage. Common in rock outcrops; coastal cliff crevice, 12 m, 27 August 1987 (#607 [61]); coastal rock cliff, 3 m, 12 September 1988 (#1421 [59]); rock outcrop, 13 m, 20 June 1993 (#4030 [84]); /AST/X/GEA/ (Ch).

*Saxifraga ferruginea* Grah. Alaska Saxifrage. Uncommon in alpine snowbeds; rock outcrop at edge of snowbed meadow, 610 m, 26 August 1987 (#640 [35]); late melt snowbed, 549 m, 5 September 1987 (#917 [38]); scarcely vegetated late melt snowbed, 701 m, 1 September 1988 (#1226 [25]); /sT/W/-/ (Hr).

*Saxifraga foliolosa* R. Br. Leafy or Grained Saxifrage. Rare in rock outcrops; rock outcrop, 792 m, 30 August 1988 (#1202E [11]); /AST/X/GEA/ (Hr(Ch)). This disjunct record is the second report from southcentral Alaska. The nearest known sites are Popof Island along the western Alaska Peninsula and in the Denali area (Hultén 1968); Racine and Young (1978) reported it

from the Turquoise Lake area in Lake Clark National Park.

*Saxifraga nivalis* L. Alpine Saxifrage. Uncommon in rock outcrops; coastal rock outcrop, 115 m, 8 July 1987 (#441A [74]); coastal rocky outcrop, 610 m, 2 September 1987 (#770 [35]); margin of waterfall, 1.5 m, 12 September 1988 (#1414 [58]); on mineral soil in canyon, 570 m, 17 June 1993 (#4028B [41]); /AST/X/GEA/ (Hr).

*Saxifraga punctata* L. var. *nelsoniana* (D. Don) Macoun (*S. nelsoniana*). Cordate-Leaved Saxifrage. Common in rock outcrops and along streamlet banks; rock outcrop at edge of snowbed meadow, 610 m, 26 August 1987 (#642 [35]); drainage channel in snowbed meadow, 610 m, 26 August 1987 (#654 [35]); streamlet bed, 91 m, 29 June 1987 (#189 [66]); late melt snowbed, 549 m, 5 September 1987 (#918 [38]); rivulet, 396 m, 6 September 1988 (#1394 [50]); rock crevice, 792 m, 30 August 1988 (#1202D [11]); var. *pacifica* (Hultén) Welsh. Uncommon in streamlet banks; streamlet bank, 61 m, 10 June 1993 (#4003 [65]); /aST/W/EA/ (Hr). Although Hultén (1968) shows the expected range of *S. punctata* var. *nelsoniana* to include the study area and the entire Alaska and Kenai peninsulas, this is the first record from this region.

*Saxifraga rivularis* L. Brook Saxifrage. var. *rivularis*. Common in wet alpine sites and along streamlets; late melt snowbed, 549 m, 5 September 1987 (#921 [38]); *Philonotis* spring mire, 518 m, 6 September 1988 (#1322A [41]); on mineral soil in canyon, 530 m, 17 June 1993 (#4026 [41]); var. *laurentiana* (Ser.) Engler. Uncommon in rock outcrops; crevice in rock outcrop, 7 m, 20 June 1993 (#4034 [84]); /AST/X/GEA/ (Hs).

*Tellima grandiflora* (Pursh) Dougl. ex Lindl. Fringe Cups. Uncommon in moist alder thickets on lower mountain slopes; moist *Alnus crispa* thicket, 61 m, 27 June 1987 (#25 [69]); *Alnus crispa* - *Oplopanax horridus* thicket, 6 m, 5 September 1987 (#87042-10 [21]); moist coastal *Alnus crispa* thicket, 2 m, 21 June 1993; /sT/W/-/ (Hsr). These records extend the known range about 200 km and help to fill the gaps between the Prince William Sound, Kodiak Island, and central-to-western Alaska Peninsula (Hultén 1968).

#### Scrophulariaceae Snapdragon Family

*Castilleja unalaschensis* (Cham. and Schelcht.) Malte. Unalaska Indian Paintbrush. Common in alpine and subalpine meadows; lush herb meadow, 119 m, 4 July 1987 (#287 [71]); forb meadow, 610 m, 26 August 1987 (#658 [35]); observed in *Erigeron peregrinus* - *Hieracium triste* low forb meadow, 792 m, 3 September 1988 [14]; *Athyrium filix-femina* - *Epilobium angusti-*

*folium* tall forb meadow, 469 m, 4 September 1988 [51]; *Athyrium filix-femina* - *Calamagrostis canadensis* tall forb meadow, 402 m, 4 September 1988 [51]; /Ss/W/-/ (Hp).

*Mimulus guttatus* DC. Yellow Monkey-flower. Abundant in moist cliff outcrops and seeps; *Mimulus guttatus* - *Achillea millefolium* escarpment crevice community, 1.5 m, 7 July 1987 (#87032-1 [76]); *Taraxacum officinale* - *Cerastium arvense* low forb colluvial debris slope, 10 m, 30 June 1987 [79]; /ST/WW/-/ (Hpr(T)).

*Pedicularis capitata* Pallas. Capitata Lousewort. Rare in alpine heaths; *Empetrum nigrum* - *Cladina stellaris* heath, 808 m, 30 August 1988 (#88002-10 [12]); *Cladina rangiferina* heath, 792 m, 30 August 1988 (#1203B [13]); observed in *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 [34]; /AST/X/GA/ (Grh).

*Pedicularis verticillata* L. Whorled Lousewort. Uncommon in alpine meadows and heaths; rock crevice in outcrop, 792 m, 30 August 1988 (#1202B [13]); *Artemisia norvegica* - *Empetrum nigrum* meadow, 792 m, 30 August 1988 (#1204 [14]); *Vaccinium uliginosum* heath, 610 m, 6 September 1988 (#1395 [35]); /aST/W/EA/ (Hs).

*Rhinanthus crista-galli* L. Rattlebox. Uncommon in coastal meadows on the northern end of Chisik Island; *Epilobium angustifolium* meadow, 6 m, 8 September 1988 (#1378 [2]); introduced.

*Veronica americana* Schein. ex DC. American Brooklime. Rare in low elevation alder swamps; *Alnus crispa* swamp along stream, 5 m, 21 June 1993 (#4044 [27]); /ST/X/eA/ (Ch).

*Veronica wormsjkoldii* Roem. and Schult. Alpine Speedwell. Common in alpine heaths and meadows; snowbed forb meadow, 610 m, 26 August 1987 (647, 646 [35]); *Salix* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1987 (#965 [24]); *Veratrum eschscholtzii* - *Senecio triangularis* tall forb meadow, 451 m, 5 September 1988 (#88037-18 [42]); low forb meadow, 469 m, 4 September 1988 (#1281 [41]); observed in *Luetkea pectinata* - *Artemisia norvegica* low forb meadow, 604 m, 14 September 1988 [38]; /aST/X/G/ (Hpr).

#### Umbelliferae (Apiaceae) Carrot Family

*Angelica genuflexa* Nutt. Kneeling Angelica. Rare in wet coastal meadows; *Calamagrostis canadensis* meadow, 2 m, 9 September 1988 (#610 [27]); /sT/W/eA/ (Hs).

*Angelica lucida* L. Seawatch Angelica. Common in coastal beach meadows; disturbed sites around cannery, 6 m, 8 July 1987 (#402 [73]); observed in *Elymus arenarius* gravelly beach ridge, 1.5 m, 9 September 1988 [28];

*Ligusticum scoticum* - *Lathyrus japonicus* pebble beach ridge, 1.5 m, 30 June 1987 [75]; *Lupinus nootkatensis* - *Epilobium angustifolium* beach ridge meadow, 2 m, 3 July 1987 [47]; *Taraxacum officinale* - *Cerastium arvense* low forb colluvial debris slope, 10 m, 30 June 1987 [79]; *Calamagrostis canadensis* meadow, 29 m, 6 July 1987 [82]; /ST/D/eA/ (Hs).

*Conioselinum chinense* (L.) BSP (*C. pacificum*). Western Hemlock-parsley. Common in coastal beach meadows; mesic shady stream canyon, 12 m, 26 August 1987 (#504 [80]); rock outcrop, 610 m, 28 August 1988 (#1200 [34]); observed in *Ligusticum scoticum* - *Lathyrus japonicus* pebble beach ridge, 1.5 m, 30 June 1987 [75]; *Elymus arenarius* - *Senecio pseudo-arnica* beach, 1 m, 1 July 1987 [68]; *Lupinus nootkatensis* - *Epilobium angustifolium* forb beach ridge meadow, 2 m, 3 July 1987 [3]; /ST/D/eA/ (Hs).

*Heracleum lanatum* Michx. Cow Parsnip. Abundant in low to mid-elevation meadows; disturbed sites around cannery, 6 m, 8 July 1987 (#404 [73]); observed in *Alnus crispa* - *Athyrium filix-femina* swamp, 122 m, 29 June 1987 [66]; *Heracleum lanatum* - *Urtica gracilis* tall forb colluvial debris slope, 12 m, 30 June 1987 [79]; *Populus trichocarpa* forest, 3 m, 1 July 1987 [28]; *Lupinus nootkatensis* - *Epilobium angustifolium* beach ridge meadow, 2 m, 3 July 1987 [3]; open *Picea sitchensis* forest, 6 m, 3 July 1987 [7]; *Calamagrostis canadensis* - *Athyrium filix-femina* tall forb meadow, 482 m, 5 September 1988 [51]; *Calamagrostis canadensis* - *Sanguisorba stipulata* tall graminoid meadow, 335 m, 5 September 1988 [53]; *Heracleum lanatum* - *Senecio triangularis* tall forb meadow, 305 m, 6 September 1988 [57]; /ST/X/eA/ (Grt).

*Ligusticum scoticum* L. Hultén Sea-lovage. Common in coastal beach meadows; *Vaccinium ovalifolium* - *Spiraea beauverdana* mixed dwarf scrub herb meadow, 128 m, 29 June 1987 (#87002-14 [63]); disturbed sites around cannery, 6 m, 8 July 1987 (#392 [73]); observed in *Ligusticum scoticum* - *Lathyrus japonicus* pebble beach ridge, 1.5 m, 30 June 1987 [75]; *Elymus arenarius* gravelly beach ridge, 1.5 m, 9 September 1988 [16]; /ST/D(coastal)/GEeA/ (Hs).

*Osmorhiza depauperata* Phil. Sweet Cicely. Rare in streamlet beds; streamlet bed, 91 m, 29 June 1987 (#197 [63]); /sT/X/-/ (Hs).

#### Urticaceae Nettle Family

*Urtica dioica* L. var. *lyallii* (Wats.) C. L. Hitchc. Stinging Nettle. Abundant on colluvial slopes at cliff bases, particularly at sites near seabird colonies; *Heracleum lanatum* - *Urtica gracilis* tall forb colluvial debris slope, 12 m, 30 June 1987 (#87008-4 [79]); observed in *Urtica*

*gracilis* escarpment debris community, 1.5 m, 7 July 1987 [79]; *Alnus crispa* - *Oplopanax horridus* thicket, 6 m, 5 September 1987 [4]; /ST/X/E/ (Grh(Hpr)).

#### Violaceae Violet Family

*Viola glabella* Nutt. ex T. and G. Stream Violet. Common in wet to wet-mesic alder thickets; *Alnus crispa* - *Athyrium filix-femina* swamp, 12 m, 29 June 1987 (#87003-3 [66]); *Alnus crispa* - *Oplopanax horridus* thicket, 6 m, 5 September 1987 (#87042-9 [21]); *Alnus crispa* - *Athyrium filix-femina* riparian thicket, 61 m, 10 June 1993 (#T3203-4 [83]); /sT/W/-/ (Hsr).

*Viola langsdorffii* (Reg.) Fisch. ex DC. Alaska Violet. Common in a wide variety of sites from moist lowland to subalpine meadows, alpine heath, mires, and Sitka spruce forests; *Picea sitchensis* forest, 3 m, 3 July 1987 (#240 [7]); *Vaccinium ovalifolium* - *Spiraea beauverdana* mixed dwarf scrub herb meadow, 128 m, 29 June 1987 (#87002-7 [66]); *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-9 [55]); wet meadow, 49 m, 6 July 1987 (#326 [78]); snowbed meadow, 610 m, 26 August 1987 (#639 [35]); *Senecio triangularis* - *Veratrum eschscholtzii* tall forb meadow, 451 m, 5 September 1988 (#88037-11 [42]); *Geranium erianthum* - *Arnica latifolia* low forb meadow, 619 m, 14 September 1988 (#88074-13 [35]); *Empetrum nigrum* heath, 536 m, 4 September 1988 (#1292 [40]); pond margin, 335 m, 5 September 1988 (#1313 [54]); *Picea sitchensis* - *Oplopanax horridus* forest, 2 m, 22 June 1993 (#4048 [7]); *Epilobium angustifolium* meadow, 70 m, 10 June 1993 (#T3201-9 [72]); /sT/W/eA/ (Hsr).

*Viola palustris* L. Marsh Violet. Uncommon in mires and meadows; mire, 119 m, 4 July 1987 (#242 [55]); *Calamagrostis canadensis* - *Sanguisorba stipulata* meadow, 329 m, 6 September 1988 (#88051-5 [56]); *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-2 [10]); open depression on *Sphagnum*, 61 m, 10 June 1993 (#4002 [72]); /aST/(X)/GEA/ (Hrr).

#### Pteropsida-Angiospermae-Monocotyledonae

##### Cyperaceae Sedge Family

*Carex anthoxantha* Presl. Arctic Grassy-slope Sedge. Rare in spring mires; wet spring mire in canyon, 396 m, 4 September 1988 (#1290B [37]); /sT/W/-/ (Grh). Although this record is just in the expected range indicated by Hultén (1968), it seems to be the first report from the region. The nearest known sites are slightly north of Anchorage and on the eastern Kenai Peninsula (Hultén 1968).

*Carex aquatilis* Wahl. Water Sedge. Rare in tidal marsh; *Triglochin maritima* - *Carex aquatilis* tidal marsh, sea level, 30 June 1987 (#87007-2 [27]); /AST/X/GEA/ (Grh(Hsr)).

*Carex canescens* L. Silvery Sedge. Rare in quiet streamlet; streamlet silt, 119 m, 4 July 1987 (#283 [55]); /aST/X/GEA/ (Hs).

*Carex circinata* C. A. Mey. Coiled Sedge. Common in alpine stony barrens; upper elevation rock outcrop, 600 m, 5 September 1987 (#854C [35]); stony barrens, 762 m, 5 September 1987 (#1016 [25]); /sT/W/-/ (Grh).

*Carex gmelinii* H. and A. Gmelin Sedge. Uncommon in coastal beaches and pond margins; pond margin, 335 m, 5 September 1988 (#1314 [54]); *Lupinus nootkatis* - *Angelica lucida* beach ridge meadow, 4 m, 11 June 1993 (#T3220-4, T3222-14 [2]); /aST/W/eA/ (Grh).

*Carex laeviculmis* Meinsch. Smooth-stem Sedge. Rare in mires; *Carex stylosa* - *Sphagnum warnstorffii* mire, 311 m, 5 September 1988 (#88045-7 [54]); *Geum calthifolium* - *Scirpus caespitosus* mire, 62 m, 24 June 1993 (#4053 [77]); /sT/W/eA/ (Hs).

*Carex lenticularis* Michx. (*C. kelloggii*). Rare in wet meadows; small pond, 314 m, 5 September 1988 (#1304 [54]); /sT/X/-/ (Hs).

*Carex limosa* L. Shore Sedge. Uncommon in mires; low sedge mire, 76 m, 6 July 1987 (#355 [77]); *Menyanthes trifoliata* - *Carex limosa* mire, 119 m, 4 July 1987 (#87022-2 [55]); observed in *Carex limosa* - *Sphagnum girgensohnii* mire, 4 July 1987 [55]; /ST/X/EA/ (Grh).

*Carex lyngbyei* Hornem. Lyngbye Sedge. Rare in tidal marshes; tidal marsh, sea level, 8 July 1987 (#381 [27]); observed in coastal *Carex lyngbyei* - *Rumex occidentalis* marsh, 2 m, 9 September 1988 [27]; /aST/D/GEeA/ (Grh).

*Carex macloviana* dUrville. Thick-head Sedge. Uncommon in subalpine meadows; disturbed sites around cannery, 6 m, 8 July 1987 (#383 [73]); herb meadow, 610 m, 26 August 1987 (#670 [35]); *Athyrium filix-femina* - *Calamagrostis canadensis* tall forb meadow, 482 m, 5 September 1988 (#88036-14 [42]); /aST/(X)/GEeA/ (Grh). This species is reported from the Kenai Peninsula but is seemingly unreported from the upper Alaska Peninsula (Hultén 1968).

*Carex macrochaeta* C. A. Mey. Long-awn Sedge. Abundant in alpine and subalpine meadows; herb meadow, 610 m, 26 August 1987 (#671 [35]); *Salix* - *Lycopodium annotinum* low deciduous thicket, 671 m, 14 September 1988 (#88071-11 [24]); *Salix planifolia* subsp. *pulchra* - *Lycopodium annotinum* low deciduous thicket, 725 m, 3 September 1988 (#88019-15 [19]); marine cliff ledge, 5 m, 21 June 1993 (#4040 [64]); observed in

- Athyrium filix-femina* - *Calamagrostis canadensis* tall forb meadow, 469 m, 4 September 1988 [51]; *Epilobium angustifolium* - *Calamagrostis canadensis* tall forb meadow, 436 m, 4 September 1988 [51]; *Veratrum eschscholtzii* - *Senecio triangularis* tall forb meadow, 451 m, 5 September 1988 [46]; *Luetkea pectinata* - *Geranium erianthum* mixed dwarf scrub - forb meadow, 396 m, 5 September 1988 [38]; *Calamagrostis canadensis* - *Sanguisorba stipulata* tall forb meadow, 335 m, 5 September 1988 [31]; /sT/W/eA/ (Grh).
- Carex media* R. Br. Intermediate Sedge. Rare in alpine seepage sites; alpine seepage meadow, 701 m, 1 September 1988 (#1224 [20]); /ST/X/EA/ (Grh(Hsr)).
- Carex membranacea* Hook. Fragile Sedge. Uncommon in marsh pools; disturbance sites around cannery, 6 m, 8 July 1988 (#397 [73]); *Picea sitchensis* forest, 3 m, 3 July 1987 (#241 [7]); *Carex membranacea* marsh, 314 m, 6 September 1988 (#1330A [10]); /AST/X/eA/ (Grh). This disjunct record extends the known range southwestwards from the Palmer area about 260 km (Hultén 1968).
- Carex mertensii* Prescott ex Bong. Mertens Sedge. Rare at cliff base; base of escarpment, 3 m, 1 July 1987 (#164 [68]); /ST/W/eA/ (Grh).
- Carex nesophila* Holm. Bering Sea Sedge. Common in alpine meadows and heaths; snowbed meadow, 610 m, 26 August 1987 (#629 [35]); *Vaccinium uliginosum* - *Cladina rangiferina* heath, 823 m, 30 August 1988 (#88001-11 [37]); *Artemisia norvegica* - *Empetrum nigrum* meadow, 792 m, 30 August 1988 (#1204D [14]); /ST/W/eA/ (Grh).
- Carex nigricans* C. A. Mey. Blackish Sedge. Common in alpine moist and wet, seepage meadows and heaths; seepage hollow in *Cassiope stelleriana* - *Luetkea pectinata* tundra, 732 m, 5 September 1987 (#1003 [25]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 654 m, 30 August 1988 (#88006-6 [18]); *Luetkea pectinata* scarcely vegetated late melt snowbed, 689 m, 1 September 1988 (#88013-2 [18]); *Hieracium triste* - *Luzula wahlenbergii* low forb meadow, 792 m, 3 September 1988 (#88017-16 [14]); *Plantago macrocarpa* - *Sphagnum girgensohnii* mire, 518 m, 5 September 1988 (#88032-2 [18]); alpine seepage meadow, 701 m, 1 September 1988 (#1224A [20]); /sT/W/eA/ (Grh).
- Carex pauciflora* Lightf. Few-flowered Sedge. Uncommon in low to mid-elevation mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-2 [55]); *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 311 m, 5 September 1988 (#88045-8 [54]); *Carex pauciflora* - *Sphagnum papillosum* mire, 76 m, 6 July 1987 (#87031-6 [10]); /ST/X/EA/ (Grh).
- Carex pluriflora* Hultén. Many-flower Sedge. Uncommon in mires; *Geum calthifolium* - *Scirpus caespitosus* mire, 62 m, 23 June 1993 (#4051 [77]); /ST/W/-/ (Grh(Hsr)).
- Carex pyrenaica* Wahl. Pyrenean Sedge. Common in alpine low forb meadows and heaths; *Luetkea pectinata* - *Geranium erianthum* mixed low forb meadow, 396 m, 5 September 1988 (#88038-37 [42]); *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 (#88039-24 [42]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 (#88066-21 [26]); *Geranium erianthum* - *Arnica latifolia* low meadow, 619 m, 14 September 1988 (#88074-25 [38]); /ST/W/EA/ (Hs). The collections on Chisik Island are slightly outside the expected range but seem to be the first records for the upper Alaska Peninsula (Hultén 1968).
- Carex rostrata* Stokes, sens. lat. Beaked Sedge. Rare; streamlet drainage channel in sloping *Carex pauciflora* - *Sphagnum russowii* mire, 37 m, 11 September 1988 (#88062-X-1 [10]); /aST/X/GEA/ (Grh(Hel)).
- Carex saxatilis* L. Russet Sedge. Uncommon in mires and swamps; mire pool, 119 m, 4 July 1987 (#261 [55]); streamlet pool in mire, 119 m, 4 July 1987 (#275 [55]); *Salix barclayi* - *Carex saxatilis* swamp, 119 m, 4 July 1987 (#87025-7 [55]); *Carex saxatilis* - *Equisetum arvense* marsh, 311 m, 5 September 1988 (#88043-1, 88043-39, 88043-40 [54]); *Eriophorum polystachion* - *Carex saxatilis* marsh, 311 m, 5 September 1988 (#88044-4 [54]); /AST/X/GEA/ (Grh).
- Carex sitchensis* Prescott (*C. aquatilis* var. *dives*). Sitka Sedge. Rare in mires; mire streamlet, 119 m, 4 July 1987 (#259 [55]); /sT/W/-/ (Grh). Hultén (1968) mapped the range of this species in Alaska from southeast into the Kenai Peninsula. This is the first known report from the western side of Cook Inlet.
- Carex spectabilis* Dewey. Showy Sedge. Common in alpine heaths; *Luetkea pectinata* scarcely vegetated late melt snowbed, 671 m, 1 September 1988 (#88013-X-3 [68]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 655 m, 13 September 1988 (#88065-37 [26]); *Empetrum nigrum* - *Vaccinium uliginosum* hummocky heath, 701 m, 14 September 1988 (#88066-9, 88068-7, 88070-8 [32]); /ST/W/eA/ (Grh). This is the first record from the western side of Cook Inlet where it is slightly outside its predicted range (Hultén 1968); the nearest known collection is from the eastern portions of the Kenai Peninsula and the Prince William Sound.
- Carex stylosa* C. A. Mey. Variegated Sedge. Uncommon in marshes and mires; *Carex saxatilis* - *Equisetum arvense* shallow marsh, 320 m, 5 September 1988 (#88043-3 [54]); *Eriophorum polystachion* - *Carex*

*saxatilis* shallow marsh, 320 m, 5 September 1988 (#88044-5 [54]); *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-11 [10]); closed wet depression, 314 m, 5 September 1988 (#1301 [54]); pond margin, 335 m, 5 September 1988 (#1315 [54]); /aST/(X)/GeA/ (Grh).

*Eriophorum polystachion* L. (*E. angustifolium*). Tall Cottongrass. Common in mires; *Carex limosa* - *Sphagnum girgensohnii* mire, 119 m, 4 July 1987 (#87023-9 [55]); *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-16 [55]); low sedge mire, 76 m, 6 July 1987 (#359 [77]); *Eriophorum polystachion* - *Carex saxatilis* shallow marsh, 311 m, 5 September 1988 (#88044-1 [54]); *Scirpus caespitosus* - *Sphagnum warnstorffii* sloping mire, 305 m, 6 September 1988 (#88047-19 [54]); *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-10 [10]); alpine seepage meadow, 701 m, 1 September 1988 (#1223 [20]); depression in *Empetrum nigrum* heath, 634 m, 3 September 1988 (#1270 [33]); /ST/X/GEA/ (Grh).

*Eriophorum scheuchzeri* Hoppe. White Cottongrass. Rare in streamlet banks; silty streamlet bank, 119 m, 4 July 1987 (#276 [55]); /AST/X/GEA/ (Grh).

*Scirpus caespitosus* L. (*Trichophorum caespitosum*). Tufted Clubrush. Abundant in mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-1 [55]); observed in *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; *Scirpus caespitosus* - *Sphagnum russowii* mire, 37 m, 11 September 1988 [10]; /aST/X/GEA/ (Hr).

#### Gramineae (Poaceae) Grass Family

*Agrostis borealis* Hartm. Red Bentgrass. Common in moist, late-snow-free alpine sites; late melt snowbed, 549 m, 5 September 1987 (#918, 982 [38]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 (#88006-18, 88007-40 [18]); *Plantago macrocarpa* - *Sphagnum girgensohnii* mire, 518 m, 4 September 1988 (#88032-6 [25]); *Luetkea pectinata* - *Geranium erianthum* mixed low forb meadow, 396 m, 5 September 1988 (#88038-19 [42]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 (#88066-22 [19]); cliff margin at summit, 808 m, 30 August 1988 (#1205C [11]); /aST/X/GEA/ (Hs).

*Agrostis exarata* Trin. Spike Redtop. Rare in open ground; disturbed areas on mineral soil, 6 m, 2 September 1988 (#1236 [73]); /sT/WW/-/ (Hs). This is a westward extension of the known range about 240 km from the Prince William Sound (Hultén 1968).

*Agrostis scabra* Willd. Hair Bentgrass, Ticklegrass. Uncommon in alluvial sites and dry, open slopes; streambed gravel, 24 m, 9 September 1988 (#1390C [22]); colluvial debris, 9 m, 12 September 1988 (#1419 [58]); /ST/X/eA/ (Hs).

*Agrostis thurberiana* A. S. Hitchc. (*Podagrostis thurberiana*). Thurber Bentgrass. Uncommon in wet sites; *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 (#88039-23, 88039-25A [42]); wet spring mire, 396 m, 4 September 1988 (#1290C [37]); *Empetrum nigrum* heath, 536 m, 4 September 1988 (#1295M [40]); /sT/W/-/ (Hs). This species has a disjunct distribution in Alaska (Hultén 1968). The record from Chisik Island is a westward extension into the western Cook Inlet region from the Palmer area.

*Arctagrostis latifolia* (R. Br.) Griseb. Polargrass. Uncommon in wet sites; drainageway in snowbed meadow, 610 m, 26 August 1987 (#651 [35]); lower colluvial slope, 12 m, 12 September 1988 (#1410 [60]); /AS/X/GEA/ (Grh).

*Calamagrostis canadensis* (Michx.) Beauv. Bluejoint. Abundant in moist meadows, thickets, and forests; *Athyrium filix-femina* - *Calamagrostis canadensis* tall forb meadow, 469 m, 4 September 1988 (#88023-19 [46]); *Calamagrostis canadensis* meadow, 3 m, 1 September 1988 (#1227 [27]); observed in open *Alnus crispa* - *Calamagrostis canadensis* scrub, 189 m, 29 June 1987 [62]; *Populus trichocarpa* - *Oplopanax horridus* forest, 3 m, 1 July 1987 [28]; *Picea sitchensis* - *Dryopteris austriaca* forest, 6 m, 3 July 1987 [7]; *Rubus spectabilis* - *Calamagrostis canadensis* thicket, 27 m, 6 July 1987 [82]; *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 457 m, 4 September 1988 [51]; *Veratrum eschscholtzii* - *Senecio triangularis* tall forb meadow, 451 m, 5 September 1988 [42]; /aST/X/GEA/ (Hsr).

*Cinna latifolia* (Trev.) Griseb. Slender Woodreed Grass. Rare in moist alluvial sites; streambed gravel, 24 m, 9 September 1988 (#1383 [22]); /sT/X/EA/ (Hs).

*Danthonia intermedia* Vassey. Timber Oatgrass. Common in bogs and snowbed meadows; *Plantago macrocarpa* - *Sphagnum girgensohnii* mire, 518 m, 4 September 1988 (#88032-7 [26]); *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 (#88039-15 [42]); *Vaccinium uliginosum* heath, 640 m, 4 September 1988 (#1291B [27]); /sT/X/eA/ (Hs). This record is a southwestern extension of the known range into the western Cook Inlet region from the eastern Kenai Peninsula (Hultén 1968).

*Deschampsia atropurpurea* (Wahl.) Scheele (*Vahlodea atropurpurea*). Mountain Hairgrass. Common in moist

- sites, meadows, and snowbeds; snowbed meadow, 610 m, 26 August 1987 (#638 [35]); cliff margin at summit, 792 m, 5 September 1987 (#1039 [11]); *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 677 m, 31 August 1988 (#88007-41 [18]); *Veratrum eschscholtzii* - *Calamagrostis canadensis* forb meadow, 396 m, 4 September 1988 (#88030-16 [46]); *Luetkea pectinata* - *Geranium erianthum* mixed low forb meadow, 396 m, 5 September 1988 (#88038-20 [42]); *Erigeron peregrinus* - *Luetkea pectinata* low forb meadow, 604 m, 14 September 1988 (#88075-20 [35]); late melt snowbed, 701 m, 1 September 1988 (#1220 [18]); steamlet margin, 518 m, 5 September 1988 (#1295R [40]); /aST/(X)/GEeA/ (Hs(Grh)).
- Deschampsia beringensis* Hultén. Bering Hairgrass. Uncommon in mires and wet sites; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-14 [55]); closed depression, 314 m, 5 September 1988 (#1303 [54]); /aST/W/eA/ (Hs).
- Deschampsia caespitosa* (L.) Beauv. Tufted Hairgrass. Uncommon in mires; *Salix* - *Sphagnum warnstorffii* mire, 311 m, 5 September 1988 (#88045-13 [54]); *Scirpus caespitosus* - *Sphagnum warnstorffii* sloping mire, 305 m, 6 September 1988 (#88047-21 [54]); *Eriophorum polystachion* - *Sphagnum riparium* mire, 37 m, 11 September 1988 (#88058-3 [10]); /AST/X/GEA/ (Hs).
- Elymus arenarius* L. subsp. *mollis* (Trin.) Hultén (*E. mollis*, *Leymus mollis*). Dunegrass, Sea Lyme-grass. Abundant in gravelly beaches; *Ligusticum scoticum* - *Lathyrus japonicus* pebble beach ridge, 1.5 m, 30 June 1987 (#87006-4 [75]); observed in *Elymus arenarius* - *Senecio pseudo-arnica* beach, 1 m, 1 July 1987 [21]; *Elymus arenarius* - *Stellaria calycantha* beach ridge, 2 m, 3 July 1987 [28]; *Lupinus nootkatensis* - *Epilobium angustifolium* forb beach ridge meadow, 3 m, 3 July 1987 [3]; /aST/X/GeA/ (Grh).
- Festuca altaica* Trin. Rough Fescue. Uncommon in alpine heaths; *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 (#88066-10 [18]); cliff margin at summit, 792 m, 5 September 1987 (#1039 [11]); /AST/D/eA/ (Hs).
- Festuca rubra* L. Red Fescue. Uncommon in gravelly beach deposits; base of escarpment, 3 m, 1 July 1987 (#168 [68]); *Taraxacum officinale* - *Cerastium arvense* low forb colluvial debris slope, 10 m, 30 June 1987 (#87009-28 [79]); *Elymus arenarius* gravelly beach ridge, 1.5 m, 9 September 1988 (#88057-3 [27]); *Lupinus nootkatensis* - *Epilobium angustifolium* beach meadow, 4 m, 11 June 1993 (#T3219-11B [2]); /aST/X/GEA/ (Hsr(Grh)).
- Hierochloa alpina* (Sw.) Roem. and Schult. Alpine Holygrass. Uncommon in alpine tundra; *Cladina rangiferina* - *Arctostaphylos alpina* tundra, 610 m, 26 August 1987 (#614 [35]); observed in *Vaccinium uliginosum* - *Cladina rangiferina* heath, 823 m, 30 August 1988 [12]; /AST/X/GEA/ (Hsr(Grh)).
- Hordeum brachyantherum* Nevski. Meadow Barley. Common in cliff walls; disturbed sites on mineral soil, 6 m, 8 July 1987 (#291 [73]); *Mimulus guttatus* - *Achillea millefolium* escarpment crevice, 1.5 m, 7 July 1987 (#87032-5 [79]); /aST/X/GEA/ (Hs(Grh)).
- Phleum alpinum* L. (*P. commutatum*). Alpine Timothy. Common in subalpine meadows; disturbed sites on mineral soil, 6 m, 8 July 1987 (#382 [73]); observed in *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 [14]; *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 [46]; *Senecio triangularis* - *Veratrum eschscholtzii* tall forb meadow, 451 m, 5 September 1988 [42]; /aST/(X)/GEA/ (Hsr).
- Poa annua* L. Annual Bluegrass. Common in cultivated lawns; cannery lawn, 6 m, 8 July 1987 (#398 [73]); introduced.
- Poa arctica* R. Br. Arctic Bluegrass. Uncommon in alpine tundra; late melt snowbed, 549 m, 5 September 1987 (#920 [38]); /AST/X/GEA/ (Grh).
- Poa* cf. *brachyanthera* Hultén. Short-anther Bluegrass. Common in cliff walls; disturbed sites on mineral soil, 6 m, 5 July 1987 (#291 [73]); *Mimulus guttatus* - *Achillea millefolium* escarpment crevice, 1.5 m, 7 July 1987 (#87032-5 [79]); /Ss/W/-/ (Hs).
- Poa eminens* Presl. Large-flower Speargrass. Common in coastal shores; *Ligusticum scoticum* - *Lathyrus maritimus* pebble beach ridge, 1.5 m, 30 June 1987 (#87006-8 [75]); *Triglochin maritima* - *Carex aquatilis* low graminoid tidal marsh, sea level, 30 June 1987 (#87007-5 [27]); observed in *Elymus arenarius* - *Stellaria calycantha* beach ridge, 2 m, 3 July 1987 [28]; *Lupinus nootkatensis* - *Epilobium angustifolium* forb beach ridge meadow, 3 m, 3 July 1987 [3]; /aST/D(coastal)/neA/ (Grh).
- Poa glauca* Vahl. Glaucous Bluegrass. Rare in dry, open slopes; lower colluvial slope, 12 m, 12 September 1988 (#1411B [60]); /AST/X/GEA/ (Hs).
- Poa leptocoma* Trin. Bog Bluegrass. Uncommon in alpine wet meadows and mires; *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 (#88017-8 [14]); *Philonotis* spring mire, 518 m, 6 September 1988 (#1322E [37]); /aST/W/eA/ (Hs(r)). This disjunct collection is part of a pattern of scattered records in Alaska where Hultén (1968) mapped the

species from the Haines region, Kodiak Island, and the Pribilof Islands. The nearest known site on Kodiak Island is about 310 km from Chisik Island.

*Poa macrocalyx* Trautv. and Mey. Large-glume Bluegrass. Common in dry, open slopes and cliff walls; base of escarpment, 6 m, 30 June 1987 (#201 [68]); disturbed sites on mineral soil, 6 m, 8 July 1987 (#395 [73]); *Heracleum lanatum* - *Urtica gracilis* tall forb colluvial debris slope, 12 m, 30 June 1987 (#87008-17 [79]); *Mimulus guttatus* - *Achillea millefolium* escarpment crevice, 1.5 m, 7 July 1987 (#87032-6 [76]); rock outcrop, 792 m, 30 August 1988 (#1202F, 1202G [11]); /aST/W(coastal)/eA/ (Grh).

*Poa palustris* L. Fowl-meadow Grass. Uncommon open, moist sites; disturbed sites on mineral soil, 6 m, 8 July 1987 (#399 [73]); /sT/X/EA/ (Hs).

*Poa pratensis* L. Bluegrass. Uncommon in dry, open slopes and beach meadows; *Taraxacum officinale* - *Cerastium arvense* low forb colluvial debris slope, 10 m, 30 June 1987 (#87009-30 [79]); *Lupinus nootkatensis* - *Epilobium angustifolium* beach meadow, 4 m, 11 June 1993 (#T3219-11A [2]); /AST/X/GEA/ (Grh).

*Puccinellia langeana* (Berlin) Sorens. Arctic Alkaligrass. Rare in brackish marshes; tidal mud flat, sea level, 9 September 1988 (#1393 [27]); /AST/X/GEA/ (Hs). This collection extends the known range eastward about 700 km from Unga Island in the western Alaska Peninsula region (Hultén 1968).

*Puccinellia nutkaensis* (Presl) Fern. and Weath. Pacific Alkaligrass. Uncommon in brackish marshes; disturbed tidal marsh, sea level, 8 July 1987 (#390 [27]); *Triglochin maritima* - *Carex aquatilis* tidal marsh, sea level, 30 June 1987 (#87007-7A [27]); /sT/W/-/ (Hs).

*Puccinellia phryganodes* (Trin.) Scribn. and Mey. Creeping Alkaligrass. Uncommon in brackish marshes; *Triglochin maritima* - *Carex aquatilis* tidal marsh, sea level, 30 June 1987 (#87007-7B [27]); /ASs/X/GEA/ (Hsr).

*Trisetum spicatum* (L.) Richter. Downy Oatgrass. Uncommon in alpine meadows; *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 (#88017-32 [14]); *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 (#88039-25A [42]); /AST/X/GEA/ (Hs).

#### Iridaceae Iris Family

*Iris setosa* Pallas. Beachhead or Wild Iris, Flag. Common in wet meadows and shores; *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 (#88047-3 [54]); /ST/D/eA/ (Grh).

#### Juncaceae Rush Family

*Juncus arcticus* Willd. Arctic Rush. Uncommon in open, mineral soils; disturbed sites, 6 m, 8 July 1987 (#388 [73]); /AST/X/GEA/ (Grh).

*Juncus drummondii* E. Meyer in Ledeb. Drummond Rush. Common in alpine, snowbed meadows; seepage hollow in *Cassiope stelleriana* - *Luetkea pectinata* tundra, 732 m, 5 September 1987 (#1004 [25]); late melt snowbed, 549 m, 5 September 1987 (#914 [38]); *Luetkea pectinata* scarcely vegetated late melt snowbed, 610 m, 26 August 1987 (#88011-8, 88012-3 [20]); *Hieracium triste* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 (#88017-7 [14]); *Geranium erianthum* - *Luetkea pectinata* low forb meadow, 396 m, 5 September 1988 (#88039-26, 88039-27 [42]); snowbed meadow, 701 m, 1 September 1988 (#1222 [20]); /ST/W/-/ (Hs). This collection extends the known range into the western Cook Inlet region from the Kenai Peninsula (Hultén 1968).

*Juncus filiformis* L. Thread Rush. Rare in wet meadows; closed depression, 314 m, 5 September 1987 (#1302 [54]); /aST/X/GEA/ (Grh).

*Juncus mertensianus* Bong. Mertens Rush. Common in wet, alpine and subalpine meadows; seepage hollow in *Cassiope stelleriana* - *Luetkea pectinata* tundra, 732 m, 5 September 1987 (#1005 [25]); silty streamlet bank, 119 m, 4 July 1987 (#285, 277 [55]); wet spring mire, 396 m, 4 September 1988 (#1290A [22]); streamlet margin, 536 m, 4 September 1988 (#1295T [40]); streamlet margin, 366 m, 5 September 1988 (#1299 [50]); /ST/W/-/ (Hs).

*Juncus triglumis* L. Three-flower Rush. Rare in subalpine heath; *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 655 m, 13 September 1988 (#88065-15 [26]); /AST/X/GEA/ (Grh(Hs)).

*Luzula arcuata* (Wahl.) Wahl. Alpine Woodrush. Common in alpine heaths; *Empetrum nigrum* - *Cassiope stelleriana* hummocky heath, 652 m, 30 August 1988 (#88006-15, 88007-18 [18]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 655 m, 13 September 1988 (#88065-14 [26]); *Vaccinium uliginosum* - *Empetrum nigrum* hummocky heath, 701 m, 14 September 1988 (#88066-19 [19]); rock outcrop, 792 m, 30 August 1988 (#1202H [11]); wind-eroded mineral soil along summit cliff margin, 792 m, 30 August 1988 (#1207 [11]); /aST/W/EA/ (Hs).

*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak (*L. multiflora* var. *multiflora*). Hairy Woodrush. Common in alpine heaths and meadows; *Salix arctica* - *Geranium erianthum* snowbed meadow, 701 m, 5 September 1988 (#958 [24]);

*Artemisia norvegica* - *Empetrum nigrum* meadow, 792 m, 30 August 1988 (#1204C [14]); *Empetrum nigrum* heath, 634 m, 3 September 1988 (#1262 [33]); /aST/X/GEA/ (Hs).

*Luzula parviflora* (Ehrh.) Desv. Small-flowered Woodrush. Common snowbed and tall forb meadows; *Luetkea pectinata* gravelly snowbed, 549 m, 5 September 1987 (#901 [35]); stony barrens, 762 m, 5 September 1987 (#1018 [17]); snowbed meadow, 610 m, 26 August 1987 (#626 [38]); *Luetkea pectinata* scarcely vegetated snowbed, 671 m, 1 September 1988 (#88011-7, 88012-2 [18]); *Erigeron peregrinus* - *Luzula parviflora* low forb meadow, 792 m, 3 September 1988 (#88017-6 [14]); *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 (#88023-16 [51]); *Veratrum eschscholtzii* - *Senecio triangularis* tall forb meadow, 451 m, 5 September 1988 (#88037-13 [42]); *Luetkea pectinata* - *Geranium erianthum* low forb meadow, 396 m, 5 September 1988 (#88038-5 [42]); *Geranium erianthum* - *Arnica latifolia* low forb meadow, 619 m, 14 September 1988 (#88074-2 [38]); cliff margin at summit, 808 m, 30 August 1988 (#1205A [11]); streambed, 24 m, 9 September 1988 (#1390B [22]); /aST/X/GEA/ (Hs).

#### Juncaginaceae Arrowgrass Family

*Triglochin maritima* L. Maritime Arrowgrass. Rare in brackish meadows; silty tidal marsh, sea level, 27 June 1987 (#12 [27]); /aST/X/EA/ (Hr).

#### Liliaceae Lily Family

*Allium schoenoprasum* L. var. *sibiricum* (L.) Hartm. Chives. Uncommon in coastal cliff meadows; marine cliff ledge, 5 m, 21 June 1993 (#4041 [48]); /ST/X/EA/ (Gb).

*Fritillaria camtschaticensis* (L.) Ker-Gawl. Indian Rice, Black Lily, Kamchatka Fritillary. Common in subalpine meadows and beach terraces; *Vaccinium ovalifolium* - *Spiraea beauverdiana* deciduous dwarf scrub meadow, 125 m, 29 June 1987 (#87002-6 [66]); observed in *Lupinus nootkatensis* - *Epilobium angustifolium* beach ridge forb meadow, 2 m, 3 July 1987 [3]; *Carex pauciflora* - *Sphagnum papillosum* sloping mire, 37 m, 11 September 1988 [10]; /ST/W/EA/ (Gb).

*Lloydia serotina* (L.) Wats. Alp Lily. Rare in rocky, alpine sites; summit cliff crevice, 823 m, 5 September 1987 (#1024 [11]); summit margin at top of cliff, 820 m, 13 June 1993 (#4013 [11]); /aST/W/EA/ (Gb).

*Maianthemum dilatatum* (Wood.) Nels. and Macbr. False Lily-of-the-Valley, Deerberry. Uncommon in lowland meadows and thickets; seen only on the southern and southeastern portion of Chisik Island; *Calamagrostis*

*canadensis* - *Rubus spectabilis* meadow, 29 m, 6 July 1987 (#87029-6 [82]); observed in *Alnus crispa* - *Rubus spectabilis* scrub, 29 m, 6 July 1987 [82]; /ST/W/EA/ (Grh). This record extends the known range about 250 km westward from the Prince William Sound and expands the range closer toward sites reported from the western Aleutian Islands (Hultén 1968).

*Streptopus amplexifolius* (L.) DC. Claspig Twisted-stalk, Cucumber-root. Common in moist meadows and alder thickets; mesic shady stream canyon, 12 m, 26 August 1987 (#552 [80]); *Vaccinium ovalifolium* - *Spiranthes beauverdiana* deciduous dwarf scrub meadow, 128 m, 29 June 1987 (#87002-4 [66]); observed in *Alnus crispa* - *Athyrium filix-femina* thicket, 335 m, 5 September 1987 [31]; *Athyrium filix-femina* - *Epilobium angustifolium* tall forb meadow, 469 m, 4 September 1988 [42]; *Alnus crispa* - *Dryopteris austriaca* thicket, 475 m, 4 September 1988 [51]; *Epilobium angustifolium* - *Calamagrostis canadensis* tall forb meadow, 457 m, 4 September 1988 [51]; *Veratrum eschscholtzii* - *Calamagrostis canadensis* tall forb meadow, 396 m, 4 September 1988 [51]; /aST/X/GEA/ (Grh).

*Tofieldia coccinea* Richards. Northern Asphodel. Uncommon in dry, alpine tundra; *Cladina rangiferina* - *Arctostaphylos alpina* tundra, 610 m, 26 August 1987 (#612 [35]); *Cladina rangiferina* - *Empetrum nigrum* heath, 802 m, 30 August 1988 (#88003-12 [12]); observed in *Arctostaphylos alpina* - *Empetrum nigrum* heath, 671 m, 14 September 1988 [34]; *Vaccinium uliginosum* heath, 650 m, 17 June 1993 (#4023 [34]); /aST/X/GA/ (Hr).

*Veratrum eschscholtzii* Gray (*V. viride* subsp. *eschscholtzii*). False Hellebore. Abundant in subalpine meadows and alder thickets; observed in *Epilobium angustifolium* - *Athyrium filix-femina* tall forb meadow, 457 m, 4 September 1988 [51]; *Veratrum eschscholtzii* - *Calamagrostis canadensis* tall forb meadow, 396 m, 4 September 1988 [51]; *Alnus crispa* - *Athyrium filix-femina* thicket, 494 m, 5 September 1988 [31]; *Veratrum eschscholtzii* - *Senecio triangularis* tall forb meadow, 451 m, 5 September 1988 [42]; /sT/D/-/ (Grh).

#### Orchidaceae Orchid Family

*Habenaria dilatata* (Pursh) Hook. (*Platanthera dilatata*). White Bog-orchid. Uncommon in mires; *Scirpus caespitosus* - *Sphagnum angustifolium* mire, 119 m, 4 July 1987 (#87024-19 [55]); observed in *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 [54]; /sT/X/EA/ (Grt).

*Habenaria hyperborea* (L.) R. Br. ex Ait. (*Platanthera hyperborea*). Northern Green Orchis. Rare in wet, alluvial sites; wet streamside gravel, 162 m, 13 June 1993

(#4017 [63]); /aST/X/GEA/ (Grt). This collection extends the known range about 400 km southwest (Hultén 1968).

*Spiranthes romanzoffiana* Cham. Hooded Ladies Tresses.

Rare in mires; *Scirpus caespitosus* - *Sphagnum warnstorffii* mire, 305 m, 6 September 1988 (#88048-21 [54]); /ST/X/E/ (Grt).

#### Sparganiaceae Burreed Family

*Sparganium hyperboreum* Least. Northern Burreed. Uncommon in shallow water; small pool in *Calamagrostis canadensis* - *Sphagnum fimbriatum* mire, 37 m, 11 September 1988 (#88059-X-1 [10]); beaver dam pond, 335 m, 5 September 1988 (#1311 [54]); aquatic in mire pool, 60 m, 23 June 1993 (#4050 [10]); /aST/X/GEA/ (HH).

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1. Reproduction and Distribution of Bald Eagles in Voyageurs National Park, Minnesota, 1973–1993, by Leland H. Grim and Larry W. Kallemeyn. 1995. 28 pp.
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6. Botanical Reconnaissance of the Tuxedni Wilderness Area, Alaska, by Stephen S. Talbot, Sandra Looman Talbot, and Stanley L. Welsh. 1995. 41 pp.

## U.S. Department of the Interior National Biological Service

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This responsibility includes fostering the sound use of our lands and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities.

